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The aim of this project was to develop effective techniques for identifying educational needs and formulating them into well-defined problems. The critical incident technique was used to identify need symptoms perceived by educators selected from a representative sample of West Coast school districts. Criteria for evaluating the adequacy of the problem-formulation product were developed, including outcomes desired, values underlying outcomes, kinds of evidence for outcomes, present conditions, solution possibilities, and immediate action alternatives. Three group problem-defining techniques were compared experimentally, each differing on two dimensions: (1) Whether or not the formulation was structured to obtain the elements listed above, and (2) whether or not the inquiry was directed by an experienced outside formulator. Eighteen three-member groups of educators were used in all. The problem definition produced by each group was evaluated independently by two other educators from the same district. Results indicated that directed groups tended to produce superior problem definitions, and suggest the need for carefully designed problem-formulation training for educators. (Author/JH)

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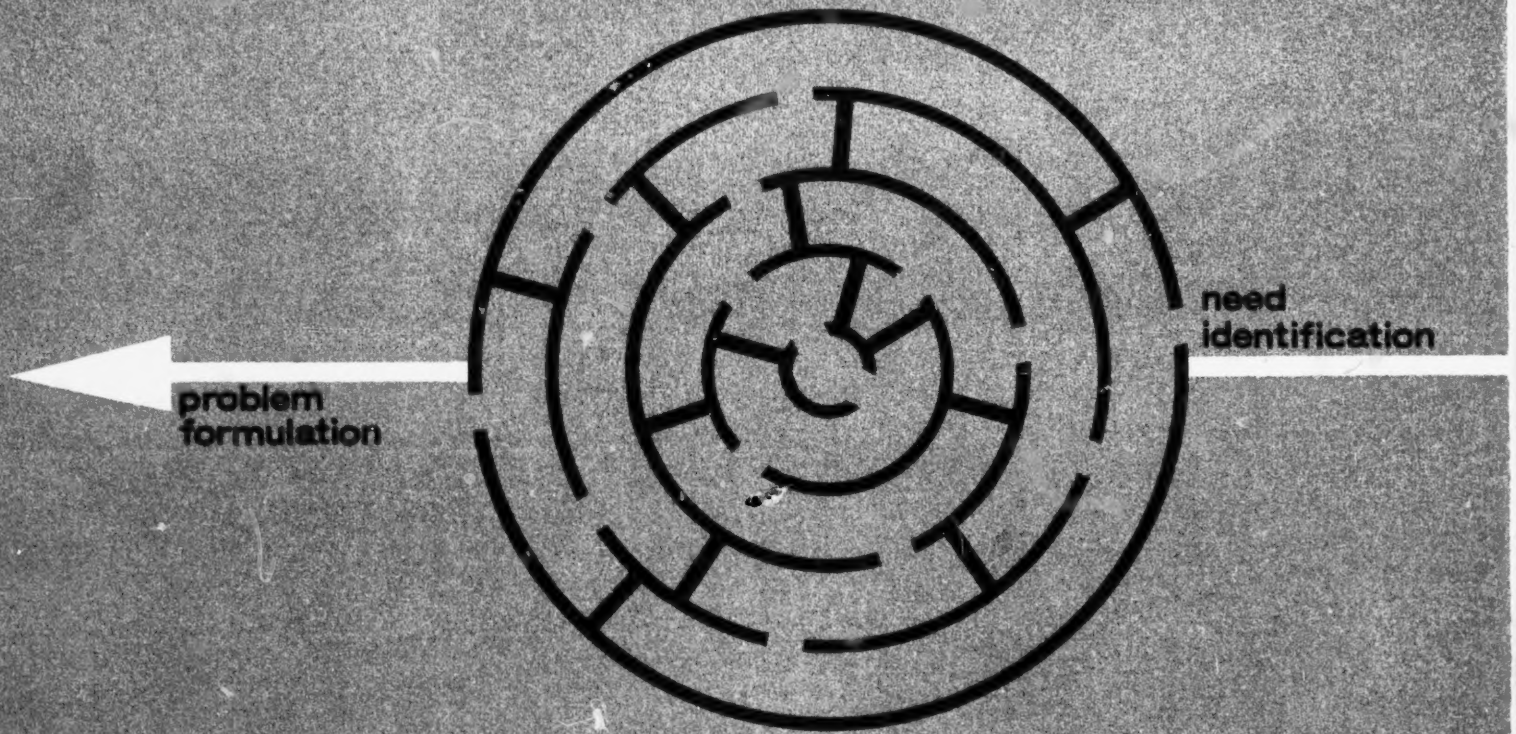
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problem
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IDENTIFYING & FORMULATING EDUCATIONAL PROBLEMS

A Final Report Prepared By
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AMERICAN INSTITUTES FOR RESEARCH
SOCIAL AND EDUCATIONAL RESEARCH PROGRAM

IDENTIFYING AND FORMULATING EDUCATIONAL PROBLEMS

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December 1967

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Laboratory for Educational Research
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ABSTRACT

The aim of this project was to develop effective techniques for identifying educational needs and formulating them into well defined problems. The critical incident technique was used to identify need symptoms perceived by educators for a representative sample of schools throughout the region served by the Far West Laboratory. A hierarchy of categories was developed to describe these need data, which were then classified and tabulated by category. The problem formulation techniques explored informally included interview, observation, and small group discussion. We decided that knowledge of problem defining behavior is too primitive to justify step-by-step systemization of the process of formulation. The techniques we developed rather relied heavily on intuitive processes, and systematic control was aimed toward insuring that the product of the formulation contained the following elements: outcomes desired, values underlying outcomes, kinds of evidence for outcomes, present conditions, solution possibilities and immediate action alternatives. We experimentally compared three group problem defining techniques which differed on two dimensions: (a) whether or not the formulation was structured to obtain the elements listed above, and (b) whether or not the inquiry was directed by an experienced outside formulator. Eighteen three-person groups of educators were used in all. The problem definition produced by each group was evaluated independently by two other educators from the same district. Results favored the directed groups; among the undirected groups completely unstructured groups rated as high or higher than groups producing a structured definition. Implications for training and promising directions for further work on problem formulation systems are discussed.

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California

Berkeley City Unified School Dist.
Caruthers Union Elem. School Dist.
Clovis Unified School Dist.
El Dorado County School Dist.
Ferndale Elementary School Dist.
Fortuna Union Elem. School Dist.
Fortuna Union High School Dist.
Fresno City Unified School Dist.
Humboldt County Supt. & Staff
Klamath Trinity Unif. School Dist.
Latrobe Elem. School Dist.
Marysville Joint Unif. School Dist.
Menlo Park City Elem. School Dist.
Petaluma School District
Sacramento City Unif. School Dist.
San Joaquin Elem. School Dist.
San Lucas Union Elem. School Dist.
Sequoia Union High School Dist.
Silver Fork Elem. School Dist.

Nevada

Elko County School District
Ormsby County School District
Storey County School District
Washoe County School District

Among our own staff at the American Institutes for Research we are indebted to Joanne Binkley for her very able assistance in categorizing critical incidents and trying out formulation techniques; also to Jack Wright of the University of Utah for his penetrating analysis of interview and observation techniques of problem formulation.

With deep regret we report the untimely deaths of two of the most able members of our project staff. Both made a substantial contribution to the project and to the fields of psychology and education generally.

> Frederick A. Zehrer, who helped design the research and collected all critical incident data in the State of Nevada, died in June 1967.
>
> Donald C. Van Ostrand, who collected incident data, explored the interview technique and created the core set of categories for classifying the incident data, died in August 1967.

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INTRODUCTION

A teacher and his principal have different views on discipline procedures for controlling tardiness and truancy. The teacher feels that he spends all his time running a prison and doesn't get much teaching done. The principal feels that the teacher wouldn't even have any students if strict control were not maintained, and recalls that a more open policy tried in the past resulted in massive truancy, tardiness, noise and vandalism in the school halls as well as on the city streets, which produced complaints by citizens, etc. The superintendent feels obliged to respond in some way.

Situations, similar to this, occur in many school districts. However, what happens next depends a great deal on how the superintendent defines the problem. For example:

> Superintendent A sees a teacher making unrealistic demands to suit his own convenience and tries to select more cooperative teachers in the future.
>
> Superintendent B sees an over-militant principal and looks for ways to create a more campus-like atmosphere at the school.
>
> Superintendent C sees the problem as one of conflicting personalities and looks toward transferring one to a different school.
>
> Superintendent D sees a communication problem and tries to set up regular channels of communication between the principal and his teachers.
>
> Superintendent E sees that the principal is rationally pursuing one objective while the teacher is just as rationally pursuing a different objective which conflicts with the first.

Each superintendent will be exploring a different set of solutions because of the particular way he defined the problem. The man who picks a problem definition well suited to the situation may find several effective solutions to choose from. The man who defines the problem less aptly may find that the best alternative action available is inadequate.

Solving problems and making decisions are widely recognized as basic and important processes to be studied scientifically and improved, in education as in other areas. A good deal of theory and research has focused on how to choose best among the available alternatives once the problem is clearly defined. Cost effectiveness strategies, computer simulation of problem solving, and theories of games, decisions and utility inevitably start with clearly defined goals and alternatives (Luce & Raiffa, 1957; Newell, Shaw & Simon, 1958; Feather, 1959; McKenney, 1967). Experimental studies of problem solving have, to our knowledge, all started with well-defined goals, whether or not the alternative actions were well defined, (e.g., Rimoldi, 1960; Hemphill & McConville, 1962; Kleinmuntz, 1966). Yet very little is known about how a problem is defined in the first place, even though this initial definition probably has more effect on the eventual success or failure of the decision than anything else. This project represents a start in the direction of trying to improve the indentification and clear formulation of educational problems.

Project Objectives

The main objective was to develop one or more ways to identify educational needs and articulate these into well defined problems which can be attacked directly by research, development or social action. A second objective was to describe the educational needs and problems currently being encountered by elementary and secondary school districts in the Far West Region.

Overview of Procedure

1. During the first six weeks of the project, we outlined a plan of action for the remaining eight months and suggested a number of possible approaches to identifying educational needs and formulating them into problems in an interim planning report (Campbell, et.al., 1967).

2. We collected a broad sample of need symptoms recalled by educators throughout the Far West Region, and classified these into need categories.

3. We reviewed the literature on problem definition and spelled out specific criteria that could be used to judge the adequacy of the formulation of a problem.

4. We explored particular problem defining actions, largely through individual interviews. From this we developed a set of key problem elements which served as a guiding framework for subsequent problem defining techniques.

5. We compared three different small group approaches to problem definition in four school districts in the region. The approaches differed in the extent to which discussion was structured and channeled toward the *a priori* set of key problem elements. In two of these districts, additional interviews and observations were conducted to check the strengths and deficiencies of the small group approach. Evaluations of the products of the problem

defining group effort were obtained from most of the participants and two independent evaluators in each district.

NEED IDENTIFICATION

Identifying a need and defining it clearly are closely interlocked processes. However, for purposes of analysis the two processes can be divided conveniently as follows: The initial act of calling attention to some area of concern will be called need identification. After a need has been initially identified any attempts to clarify the nature of the need or to spell out alternative courses of action will be called problem formulation or problem definition.

There are many reasonable procedures for identifying educational needs of a school district. Educators within the district may do so on the basis of their recent experience. Outside experts, or educators within the district, may collect new data as a basis for identifying needs. The data may involve observation, questionnaires, checklists, interviews, and inspection of documents among other things. In order to achieve our second objective, i.e., to collect a coherent body of data on actual current needs in the region, our effort at need identification focused on a single promising technique which had not been previously tried in this context, the critical incident technique.

The Critical Incident Approach to Need Identification

The process by which needs are identified has usually been intuitive, even in recent years. Most commonly, a leader in education, science, or public life calls attention to some deficiency in education after an unknown process of observation and thought. Occasionally the assertion is based on explicit research findings.

There has been little scientific research on the identification of educational needs. Most systematic efforts at need assessment have been generated by recent governmental programs of research and development in education which require that need assessment be part of initial planning. These studies have usually involved asking people with various slants on education to make a direct judgment of the degree or presence of a need. These are useful data since efforts to meet needs depend upon their being perceived by persons who have power or information relevant to the needs. An interesting matter, however, is to what extent such judged needs are based on hearsay and the general hue and cry, rather than upon experienced failures in the school's operation.

We chose the critical incident approach to identifying needs in order to bring to light the specific, concrete experiences of educators on which, we assume, judgments of felt need are based. The critical incident technique (Flanagan, 1954) was developed mainly to identify good and poor performance on the job by focusing on the most memorably effective and ineffective behaviors of a particular person in that position. The present application of the technique identified many kinds of events within a system, without restricting the data to behaviors of a single person, although many of the events were in fact individual behaviors. Educators were asked to recall a specific event or condition observed recently which made them feel that something about their educational system needed improving.

The Sample. In order to obtain a representative sample of need symptoms, as we will refer to these recalled events, we first spelled out the variables differentiating schools in the Far West Region that might be associated with the greatest differences in the specific experiences and felt needs of educators. The following variables were considered in sampling: geographical area, population density, size and type (elementary, secondary, unified) of school district, socio-economic level, and racial composition. The twenty-three school districts and county offices which provided critical incident data were handpicked to be representative of the region as a whole on the above variables, but without any prior knowledge of the particular educational needs which might be identified.

The number of educators requested to participate in each district was roughly proportional to the size of the district. The administrator within the district who arranged for the data collection was asked to choose a variety of teachers, administrators, counselors, coordinators, consultants and persons in other positions so the sample would be approximately representative of the distribution of educational positions in the district.

Participants convened within a school or district to complete the critical incident forms which are shown in Appendix A. The form requested four instances of symptoms of an educational need, and one instance of an event which indicated a need well met. The following instructions were given to the participants:

1. The purpose of the project and potential value to schools were outlined.

2. Confidentiality and anonymity were assured.

3. The need for specificity of incidents was emphasized.

4. Incidents were invited from any aspect of education, including, but not limited to, student performance, administration, guidance, instruction, learning, behavior, curriculum, human relations, or communication. No

examples of incidents were given because of the known channeling effect of providing examples.

The Nature of the Reported Incidents. The critical incident form requests the respondent to try to remember a specific recent event. However, many of the reported problems are more general in nature than a specific incident, summarizing either a set of events or a generalized feeling. Interviews with respondents suggested that they felt that the data collection effort could not profit as much from the trivial details of everyday existence as it could from responses which summarized these details. Some respondents viewed with disbelief our request for simple narrative descriptions, thinking we might be disguising a different research interest. Thus there is a large amount of variability in the type of report received. Some reports are, indeed, critical incidents, such as the arrest of a student for selling drugs. Others are far more general and are not properly called "incidents", although that term will be used here for convenience. Among the wide range of responses are system critiques, worries about societal trends, and questions about the proper function of the school system. Data of these types do not lend themselves to simple classification in such terms as principal agent, location, effect, etc., as might a set of incidents which were all at a simple operational level.

Basic Classification. The negative incidents, or need symptoms, have been classified in terms of the major stated or implied locus of the difficulty, as reported by the respondent. Although project staff were tempted to reinterpret some of the reports ("This one really seems to be a problem with x, not y"), every attempt was made to avoid reinterpretation, in order that the classification would represent educators' perceptions of problem areas, and not those of the staff. A second intent of this restriction to what the educator explicitly said was to minimize the amount of inference needed in classifying the incidents.

The complex nature of the problems often made unitary rather than multiple classification somewhat arbitrary. For example, a criticism of allocation of funds would almost always include an explicit or implicit regret about the insufficiency of funds in general. If general insufficiency was not mentioned, it would be classified under allocation. If both were mentioned, it would be classified under the more strongly emphasized one.

There is a similar nesting of categories in the case of problem children and their parents. Some reports clearly stated causal hypotheses about deviant or inadequate parental behavior being responsible for deviant child behavior. The stated locus of the problem is clearly the parent in these cases, and the incidents were so classified, even though student behavior was cited also. In other cases, however, no parental reference was included to explain deviant child behavior. In the absence of such reference, the child himself was classed as the stated locus of the problem, even though the inferential leap to the parents' behavior would be very short in many cases.

Systematic reliability checking of the categorization was not done, but the development of the categories was done in several parallel independent stages, with rater disagreement used to modify categories. The categories were developed inductively from the data, as described in a later section. Reliability is affected adversely both by the multiple nature of the problems and by the large number of categories. But a large number of categories was retained in order to describe the data more fully.

Development of the Categories. An initial reading of several hundred incidents revealed that the majority of the negative incidents fell into two basic categories: those in which the focus was on the behavior of specific individuals, and those in which the focus was on the functioning of some aspect of the overall system. These two broad categories can generally be distinguished in terms of potential corrective action. The incidents in the individual (I) deviation category suggest changing the behavior of the deviant individual or perhaps replacing him. Incidents in the system (S) category suggest a change in policy, procedure, equipment or some feature of the system other than the particular people in it. Some incidents imply a change in the relation of the school system to other systems with which it interfaces, such as the community, publishers, or the state. Of course, many system changes would be easier to implement with a corresponding person change, and some person changes would result in system changes, but the categorization scheme does not explicitly deal with this kind of inference. Examples of incidents in each category are given in Appendix B.

Individual Behavior. The broad "I" category was first subcategorized logically in terms of the role of the person or persons being critically evaluated. These are shown as major outline headings in the listing of I categories (Table 1) and are I1, Student; I2, Teacher; I3, Specialized School Personnel; I4, Administrator; I5, Parent. Each of these categories was then subdivided inductively according to the kind of criticism being leveled at the individual(s). The rationale for the subcategories varies from main category to main category, according to how the incidents were found to cluster. Thus the subcategories for students (I1.1, I1.2, etc.) vary according to the severity and effect of the deviant behavior, while the subcategories for teachers (I2.1, I2.2, etc.) and administrators (I4.1, I4.2, etc.) vary by task function or area of competence.

System Function. An initial attempt was made to achieve symmetry between the system (S) and individual (I) categories by making the subcategories parallel. This was successful for a subset of the incidents, but the scheme awkwardly crosscut a number of categories which were developed inductively, directly from the set of "S" incidents. Attempts to keep the two breakdowns parallel were eventually dropped and the current scheme evolved. Overlaps in the categories and complexity and generality of many of the incidents pose more of a reliability problem in the "S" category than in the "I" category.

TABLE 1

FREQUENCY OF INCIDENTS IN EACH EDUCATIONAL NEED CATEGORY

Total Number of Incidents per Category According to Position of Respondent				Category Description
Teacher	Admin	Other	Total	
622	289	131	1042	ALL INCIDENTS
488	225	96	809	NEGATIVE INCIDENTS
217	100	43	360	Negative Incidents: Major Category I
75	22	20	117	I1 Student
11	5	5	21	1.1 Problems with conduct or academic performance, the causes of which are perceived as basic emotional or physiological disturbances of the student.
36	12	11	59	1.2 General misbehavior of students, both in class and outside, not seen to be pathological.
28	5	4	37	1.3 Passive resistance in which the students either do not attend class or show no interest or motivation in completing assignments and participating generally.
35	34	17	86	I2 Teacher
6	13	9	28	2.1 Lack of knowledge in subject area or inadequate instructional and professional skills.
18	6	3	27	2.2 Lack of skill or propriety in personal interaction with and disciplining of students.
11	15	5	31	2.3 Poor relations with colleagues and/or the administration through failure fo follow appropriate procedures or a general inability to get along.

TABLE 1 (Contin.)

Total Number of Incidents per Category According to Position of Respondent				Category Description
Teacher	Admin	Other	Total	
9	6	1	16	I3 Specialized School Personnel
5	4	1	10	3.1 Failure of a counselor or psychologist to perform duties properly.
4	2	0	6	3.2 Failure of other special personnel, such as nurses and consultants, to perform duties properly.
75	28	2	105	I4 Administrator
14	10	0	24	4.1 Administrative actions or decisions made without consultation and participation of those in the system affected by those decisions/actions. In general, these incidents are requests for less authoritarian, more participative management.
46	9	1	56	4.2 Functionally poor decisions and actions, inconsistency, inconsiderateness where participative issues are not involved.
11	8	1	20	4.3 Insufficient or inaccurate advance planning in regard to general educational objectives and/or fiscal affairs.
4	1	0	5	4.4 Personal conflicts among administrators or between administrators and teachers.
23	10	3	36	I5 Parent

TABLE 1 (Contin.)

Total Number of Incidents per Category According to Position of Respondent				Category Description
Teacher	Admin	Other	Total	
14	2	3	19	5.1 Poor home conditions; lack of discipline, attention, etc., which lead to deviant student behavior.
9	8	0	17	5.2 Overt lack of cooperation with the school.
271	125	53	449	Negative Incidents: Major Category S
54	14	9	77	S1 Curriculum
40	11	6	57	1.1 Inappropriate content of existing courses or balance between academic categories; certain courses need to be added or deleted; content coordination within schools and between schools needs improvement.
6	0	0	6	1.2 Excessive stress on extra curricular activities at cost of academic activities.
8	3	3	14	1.3 Need for non-academic courses such as sex education, health and safety, to teach students about their roles and responsibilities in society.
27	11	3	41	S2 Instructional Methods
2	5	1	8	2.1 Ineffective methods, general resistance to innovation.
16	6	2	24	2.2 Poor adjustment of students, as evidenced either by emotional problems or lack of knowledge appropriate to grade level, attributed to ineffective methods.

TABLE 1 (Contin.)

Total Number of Incidents per Category According to Position of Respondent				Category Description
Teacher	Admin	Other	Total	
9	0	0	9	2.3 Inadequacy or insufficiency of instructional materials and teaching aids.
29	5	2	36	S3 Guidance and Placement
16	5	2	23	3.1 Inappropriate placement of students in classes or programs by teachers, administrators and guidance personnel.
13	0	0	13	3.2 Inadequate, inappropriate, or disruptive grading and testing procedures, including pass/fail/graduation criteria.
51	22	9	82	S4 System Expansion
18	12	2	32	4.1 Insufficient teaching and administrative staff for present system.
19	8	4	31	4.2 Insufficient physical facilities and equipment for present system.
7	0	1	8	4.3 Excessive class sizes and student/teacher ratio.
7	2	2	11	4.4 Additional remedial or accelerated programs or classes outside current curriculum are needed.
21	18	9	48	S5 Staff Competence

TABLE 1 (Contin.)

Total Number of Incidents per Category According to Position of Respondent				Category Description
Teacher	Admin	Other	Total	
7	5	2	14	5.1 Inadequate policies and procedures for hiring and retention of teachers; teacher placement.
14	13	7	34	5.2 Inadequate or inappropriate college preparation of teachers and/or inservice teacher training.
38	14	9	61	S6 Formal Prescriptions Within the Administrative System
35	12	7	54	6.1 Policies governing student/staff behavior and administrative procedures need evaluation or modification.
3	2	2	7	6.2 Unclear or inappropriate job definitions and responsibilities.
8	13	4	25	S7 Social
3	8	3	14	7.1 Segregation problems.
5	5	1	11	7.2 Problems caused by or related to other social issues, such as juvenile delinquency, achievement orientation, etc.
15	9	6	30	S8 Inadequate Communication
2	1	0	3	8.1 Throughout the system.

TABLE 1 (Contin.)

Total Number of Incidents per Category According to Position of Respondent				Category Description
Teacher	Admin	Other	Total	
7	3	3	13	8.2 From teachers
0	2	1	3	8.3 From special personnel
5	3	2	10	8.4 From administrators
1	0	0	1	8.5 From outside institutions
13	9	1	23	S9 Funding
7	4	0	11	9.1 Allocation of existing funds
6	5	1	12	9.2 Inadequate funding
10	6	0	16	S10 Legal Prescriptions for School System Practice
4	3	0	7	10.1 Excessive or unwisely exercised jurisdiction over curriculum and texts.
6	3	0	9	10.2 Excessive or unwisely exercised jurisdiction over general operation of educational system.
1	3	0	4	S11 Change in Practices of Suppliers, Publishers and Other Outside Agencies.
4	1	1	6	S12 Time Pressures on Staff To Do More Than is Realistically Possible.

TABLE 1 (Contin.)

Total Number of Incidents per Category According to Position of Respondent				Category Description	
Teacher	Admin	Other	Total		
134	64	35	233		POSITIVE INCIDENTS
11	6	3	20	1	Student
7	1	0	8		1.1 Good performance or motivation in class.
4	5	3	12		1.2 Good interpersonal relations; responsible behavior.
39	19	7	65	2	Teacher/Teaching Methods
34	10	5	49		2.1 Good academic performance and adjustment of students seen to result from teacher's instructional methods or interpersonal techniques.
4	6	0	10		2.2 Good scholastic performance and/or overall behavior as a function of the instructional setting.
1	3	2	6		2.3 Successful inservice training for staff.
5	2	3	10	3	Discipline/Direction. Improvement in individual student behavior or performance through successful discipline, direction, or counseling.
7	2	5	14	4	Placement. Effective placement of students; placement instruments are effective and efficiently used.

TABLE 1 (Contin.)

Total Number of Incidents per Category According to Position of Respondent				Category Description	
Teacher	Admin	Other	Total		
12	7	1	20	5	Administration
8	3	0	11		5.1 General cooperation between administrators and teachers; administrative support of teacher attitudes and innovation; participative management.
4	4	1	9		5.2 Strong leadership; administration takes initiative toward innovation; plans well; makes wise decisions.
2	0	1	3	6	Equipment. Teachers and staff are provided with the equipment they need to perform their duties.
21	10	1	32	7	Curriculum
10	5	1	16		7.1 Effective curriculum; proposed or recently instituted curriculum development or change is promising
11	5	0	16		7.2 Successful special programs such as work/study, Head Start, accelerated and remedial programs.
13	4	2	19	8	Extra Curricular Activities. Effectiveness of extra curricular activities, such as plays and concerts.
0	6	2	8	9	Social Issues. Genuine efforts to eliminate segregation and racial tension.
10	2	5	17	10	External Indicators of System Success.

TABLE 1 (Contin.)

Total Number of Incidents per Category According to Position of Respondent				Category Description	
Teacher	Admin	Other	Total		
7	2	4	13	10.1	Scholarships and honors awarded to students and schools; graduates successful academically or vocationally.
3	0	1	4	10.2	Favorable evaluations of the school or district by community and graduates.
8	4	5	17	11	Communication
4	1	3	8	11.1	Effective communication between school and parents regarding student progress.
4	3	2	9	11.2	Effective communication within system and between school and community at large regarding the functioning of the school system.
6	2	0	8	12	Miscellaneous

S1 through S5, i.e., Curriculum, Instructional Methods, Guidance and Placement, System Expansion and Teacher Competence, all relate basically to instruction-related classroom activities. The separation between these categories is clear in most cases. However, a problem which involves improving teacher competence in order to use new methods to introduce a modified curriculum in an expanded system which uses more sophisticated placement could fit in any or all of these five categories. Fortunately for classification purposes most respondents did not enumerate procedural and causal chains in this detail, so classification on a non-inferential level could be carried out reasonably easily. This form of classification identifies an issue within a broad category (e.g. S1-S5, inclusive) then pinpoints saliency for the specific respondent.

The interpretation of S6-S12 is less direct. Each of these appears to be a discrete issue, but because communication is on a different level of analysis than funding, for example, it is difficult to relate the two. Communication difficulties could involve any of the other categories in this analysis. As with the other categorization problems, specific attributions of the locus of difficulty were used as much as possible to derive these categories. Subcategories were derived similarly.

Positive Incidents. There are clear parallels between the positive and negative incidents, although the smaller number of positive incidents led to the development of fewer subcategories. It should be noted that the smaller number of positive incidents was a function of the data collection procedures (four negative forms, one positive form per respondent) and not of respondent bias or preference. Occasional respondents failed to answer the positive page (the second) and a few mistakenly provided a negative incident on that page, but the bulk of omissions were of the third or fourth negative incident -- usually a function of time pressure. Because the positive reports tended more often to be actual incidents, less difficulty was encountered in deriving the categories and coding. The same inductive procedures were used.

Frequency Tabulations. The incidents have been tallied in Table 1 by incident categories of all levels. They have been cross tabulated according to the job classification of the respondent. One can see at the top of Table 1, for example, that a total of 1042 incidents were collected. Of these, 809 were negative. Looking down at the I2 category, one can see that of the 86 criticisms of individual teachers, 35 were made by teachers and 34 by administrators. Comparing these in ratio to the total number of "I" incidents contributed by teachers and administrators, it can be seen that administrators contributed approximately twice as many such criticisms in proportion to the marginal totals (34/100 vs. 35/217). The raw frequency data in the I4 category suggest the expected reversal of this distribution, with 75 negative incidents about administrators provided by teachers and 28 provided by administrators. The ratios do not bear this out as strongly as the raw frequencies suggest, however -- 75/217 vs. 28/100 or .35 vs. .28.

Comparisons between respondent groups must take these ratios into account. Within or across respondent groups, the raw frequencies can be used directly.

A Comparison with PACE Center Need Assessment Data

It is difficult to make a direct comparison of the tabulation of incident data with the needs identified by the Title III Supplementary Education Centers for several reasons. The needs reported by the centers are summaries of data which have been gathered in a wide variety of ways, so a single methodological contrast cannot be made. Some PACE center efforts involved questionnaires which were far more structured than our incident forms, while others used much more freewheeling conference/consensus techniques.

A fundamental difference between the PACE reports and this summary of data is the difference in level of generality. The PACE needs are generalizations which have been derived from data. The incidents and needs reported here have not been summarized in this way, because the intent has been to identify symptoms of needs rather than needs themselves. Also, some of the PACE data have been deliberately given priority ranking, while only a tacit set of priorities can be derived from the frequencies in the data in this report.

There are, of course, parallels between PACE needs and the incident categories, just as there are parallels from PACE center to PACE center. Curriculum, guidance, and social problems all receive strong emphasis in both. But there is a clearcut difference in general content between the PACE summaries and the incident data. The incident data reveal a much stronger focus on internal system operation, management, and personnel practices. Of 146 reported needs from 18 county PACE centers (with many overlaps of needs) only one reported need involved such internal system issues. Clearly the focus of the PACE effort is on external system goals, as the majority of the needs are stated in terms of broad effects of the school system on the students.

Potential Uses of the Incident Data

One of the initial reasons for collecting the incident data was to identify the potential range of problems which a problem formulation system might encounter. A second was to get examples of the form which initial inputs to the system would take if educators were asked to provide observational data. One type of potential use of incident data is to classify and store it at a regional, state or national information center to be used as a resource by problem formulators or for other research purposes. This is discussed further in the final section of the report.

Another more direct use of the technique is to identify needs in a given school system as an input to problem formulation. Judging by the wide variation in the incident data we obtained it is clear that an important initial task of a problem formulation system is to ascertain whether an incident reported identifies one need, none, or many. Although a few respondents reported an incident with no apparent implication beyond, "That's the way life is," most incidents pointed clearly to at least one need. Where many needs are identified the problem formulation system may need a criterion for selecting which most deserve defining clearly, or else a classification system which indicates how different types should be handled. One might imagine an initial screening routine which would route different perceived needs to different formulation subsystems. Decisions about what needs to exclude, and what the division of subsystems might be should be made with knowledge of the general economic structure of the system. The sources of funding, questions of who initiates the formulation interaction and estimates of potential payoffs are all relevant to such decisions.

PROBLEM FORMULATION

A survey of the educational literature on techniques for defining problems, as distinct from identifying needs, reveals very few studies, and these tend to treat problem definition as a single step in problem-solving (e.g., Schmuck, et al., 1966). Literature on defining problems comes mostly from other disciplines. In clinical and industrial psychology attention has been given to the interview as a technique for defining personal or interpersonal problems (Sullivan, 1954; Maier, 1958; Kahn & Cannell, 1958). The study of that aspect of industry which has to do with maintaining complex machine or man-machine systems has evolved a problem formulating technology called troubleshooting. However in troubleshooting, as in medical diagnosis (e.g., Rimoldi, 1960), the problem is already partially defined in that the goals are clear. The fields of business management and public administration, too, have apparently been struck by the frustration of trying to solve problems before they are well defined (Barnard, 1938; Simon, 1950; Griffiths, 1959; Markle, 1967; Odiorne, 1965; Kepner, 1965; Timms, 1967).

As noted earlier most studies of behavior "about problems" concentrate mainly on solving problems rather than on defining them. However, some of this research does delve into the prior process of problem definition, especially those studies which involve "intensive tinkering" with the creative process. Mednick (1962) inferred three important heuristics for having good ideas about problems: serendipity, similarity, and mediation. He hypothesized that massed practice on a problem would work better because the intensive thought over a considerable length of time would enable more remote associations to yield new ideas. The "Synectics" group at Harvard (Gordon, 1961) found it fruitful to make familiar things seem strange by developing analogies regarding them and thinking about them metaphorically. Maier and Solem (1962) found that "problem mindedness" was more effective than "solution mindedness" in generating better solutions to problems. They inferred that problem orientation increased the number of alternatives considered, which increased the quality of problem solutions.

Many studies (e.g., Duncker, 1945; Scheerer, 1963) have found that functional fixedness or stereotyped thinking regarding solutions interferes with effective problem solving. However previous experience may also have a positive transfer effect or no effect at all, depending on its relation to the problem to be solved (Jensen, 1960; Gibbons, 1965; DiVesta and Walls, 1967). It is reasonable to expect that transfer in defining problems should likewise vary as a function of the similarity in the structure of the problems.

An empirical approach to defining educational problems might be to observe how it is now being done, either by typical educators or by those reputed to be especially good or poor at defining problems. Then one could combine the more promising practices observed into some overall procedure. Another approach, often identified with systems analysis, is to begin by spelling out the objectives of the educator or educational unit which feels a need. From these objectives the problem formulator may then deduce problems and needs by comparing the logical implications of these objectives with characteristics of the existing system. In this way he may well wind up defining problems or needs that had not yet come to the attention of the educator within that system at all. A program is currently underway in California to develop use of the system analytic approach in educational planning by local and state educators (Miller, 1967; Johnson, 1966). The empirical and logical approaches may be combined in many ways, of course, and our own effort to develop problem formulation techniques represents one of these ways.

Criteria for the Adequacy of Problem Definitions

Although things got worse later, we started off in trouble because defining a problem is not a well defined task. One of our primary aims therefore was to spell out reasonable criteria for judging when a problem is well formulated. Criteria will be listed and discussed under three headings: (a) the important parts or kinds of content which a complete problem definition should logically include; (b) characteristics of all parts of the content which are expected to make the formulation more effective; (c) practical consequences of having a problem well or poorly defined.

A. Rational Elements of a Defined Problem. No matter who translates an identified need into a well defined problem, nor by what process it is done, we assume the results must be a recordable communication to those who are concerned with acting on the problem. In elementary and secondary education, virtually every need requires a joint decision and/or a joint action by two or more persons. We therefore assume that in practice a good problem definition would be recorded in some way so that it could be referred to, re-examined, and perhaps revised during subsequent processes of action on the problem. This assumption enables us to apply our criteria for problem definition to a tangible product in every case rather than relying on evaluation of a process. By contrast, defining and solving a private personal problem might take place effectively without any observable, recordable product.

The question arises whether all well defined problems encountered by elementary and secondary educational systems have certain essential elements in common. We have encountered no experimental evidence indicating whether the inclusion or exclusion of certain elements in a problem definition matters to its subsequent effectiveness. The discussion of each element in the list below is thus confined to a rational analysis of its importance.

1. Outcomes Desired. If a need exists, then something is unsatisfactory and needs improvement. Knowing what is wrong about the

status quo does not necessarily tell what state of affairs would be considered right. The desired results need to be spelled out explicitly. If more than one outcome is sought, priorities or relative importance of the outcomes need to be specified as a basis for later choices between alternative actions which serve different outcomes.

2. Reasons for Valuing Outcomes. One common type of regret or failure which can sometimes be attributed to inadequate problem definition is that in which achieving the outcomes directly sought results in the side effect of losing some other more important goal. For example, a series of disciplinary policies and actions designed to reduce the amount of noise and distraction in classrooms may effectively do this and at the same time have the overriding bad effect that students feel so oppressed that they no longer inquire or seek to learn on their own. Spelling out the values affected adversly by achieving the specific outcome sought, as well as those values served positively, may well change the educator's priorities among outcomes.

What about personal ulterior motives for seeking particular educational outcomes? These may have important effects on educational decisions made by individuals and must be taken into account if we are seeking ways to define and solve the problems of individuals. However, since the concern here is with the problems of educational bodies which have a public responsibility, from both an ethical and a practical standpoint we can safely omit reasons and values which are not publicly justifiable. It is appropriate to examine such personal motives as aids or hindrances to achieving the desired outcomes, but not as ends in themselves.

3. Evidence of Outcome Achievement. It often occurs that after an innovation has been tried by a school system for a year or two there is a prolonged debate over whether it is working or not. This could be avoided by agreement in advance on what will be accepted as evidence that the desired outcome is achieved. Requiring that evidence of outcome achievement be spelled out has an important consequence in addition to knowing whether you're getting there or not. Outcomes or objectives are often stated in general, vague terms. Agreeing on evidence often forces the problem formulators to be more specific about the outcomes sought and thereby to communicate more clearly. The benefit works in the other direction too. Specifying outcomes separately from their evidence helps to avoid "teaching the test". If the objectives are lost sight of and the evidence becomes an end in itself the result may be sham achievements, such as students who know the big words but can't apply them usefully, or puppet student governments.

4. The Present Condition. Sometime before the stage of proposing action one must assess the extent to which the outcomes desired are already being achieved. A good deal of what might be brought up in describing the present condition and its context might in retrospect be considered irrelevant distractions from getting at the heart of the problem. Yet it is difficult to know in advance which conditions will turn out to be relevant and which irrelevant.

One class of conditions which is of uncertain value as an input to the problem definition process is that of "causes" of the problem. Good definitions and solutions to problems are indeed often obtained by identifying causal factors and proposing ways to remove them. On the other hand, problem formulation may result in restructuring the whole problem so that outcomes are sought by new approaches which totally disregard the causes of the problem as it was initially perceived. For example, a need initially identified as getting students to turn their homework in on time might be attacked by examining causes of their laxity and trying to remove them. On the other hand, spelling out objectives (e.g. "that students learn all they are capable of in a subject matter") might lead to dropping homework deadlines from the list of outcomes desired.

Some aspects of present conditions are essential as background for evaluating proposed actions. One such kind of information consists of limiting factors such as budget, personalities, laws, policies, etc., which will have to be accounted for regardless of what action is chosen. One of the advantages of spelling out these limiting factors is that they may be challenged if they are explicit but not if they remain as unspoken premises. When stated in words a way may be found to overcome such obstacles by assuming different premises. Another valuable kind of background information is the history of previous actions taken to meet this need and the results of such actions.

5. Possible Courses of Action. Problem formulation may be defined to include spelling out alternative possible actions or to exclude it on the grounds that it is part of solving the problem rather than defining it. Our reason for including it is that people are strongly inclined to discuss solution ideas, whatever phase of problem definition they may nominally be involved in. As will be discussed later, this may or may not contribute to effective problem definition and solution, but the fact is that it is hard to avoid entanglement of these aspects of the total analysis of the problem when you are using real human problem solvers without suppressing their activity altogether. We also include evaluation of the pros and cons of any suggested action as part of the process of problem formulation, though we stop short of including any actual decision or choice among alternatives. The phrase "courses of

action" is meant to include taking no action, getting information through search or research, immediate steps, contingent sequences of action, and long-run solutions or programs.

B. Effective Characteristics of the Content of a Problem Definition. The following criteria are applicable to the content of any problem definition, whether its parts are the kinds described above or not. These criteria are internal like those above in that they do not refer to consequences of problem definition but to the definition itself. The importance of these internal criteria is that they may be used immediately on completion of the problem definition, as was necessary in the present research.

1. Number of Relevant Ideas and Facts. The problem definition may be considered to be a resource for the decision maker. If it is a resource and not a constraint, then the decision maker is free to reject as much of it as he pleases. From this standpoint the average quality of the ideas in the document may not be as important as the total number of good ideas and relevant facts. Since it is usually hard to know whether an idea is good or not until it has been tested, the total number of relevant ideas is a practical criterion which does not require dealing with the slippery criterion of quality.

2. Quality of Ideas. As difficult as it may be to measure quality in a satisfactory way, nearly everyone seems to think that quality is close to the heart of the matter and cannot be ignored. It is the characteristic which comes closest to being a prediction of the potential effectiveness of the formulation in later decision-making. Quality measures can of course be applied to the individual ideas in a statement or to the total problem definition. An interesting approach to measuring the quality of the total definition is to ask someone familiar with the problem or similar problems to list the critical questions about the problem which are yet to be asked or answered by the problem definition. Of course the number and kind of such questions can be expected to vary with the type of problem and the repertoire of the evaluator. These sources of variation might be controlled to some extent by categorizing the most critical questions which are typically asked and providing the evaluator with the categories or even the questions as a check list.

3. Relatedness of Parts. The worth of relating outcomes to values and to evidence of these outcomes was discussed above. It is equally necessary that the other parts or elements of a problem formulation be closely related in order to keep the formulation on track and also to stimulate new ideas through the conjunction of parts. As an example of the latter, identifying symptoms of the present condition may suggest new kinds of evidence to be used in measuring achievement of the desired outcomes, and vice versa. Keeping on track is a critical

problem in view of the very short attention and memory span of human beings. When the parts of a problem definition are developed separately it seems to be quite easy for them to become unrelated or even inconsistent. For example, solutions may be proposed which seem to be promising for some purpose but do not directly serve the top priority objectives. Turner and Fattu (1960) concluded that consistency was a more useful criterion of problem solving proficiency in elementary school teachers than were consensual or ultimate criteria.

4. Clarity and Precision determine the communicative value of the problem definition. In addition, clear, precise statements of the problem are more likely to facilitate decision-making than are ambiguous statements.

5. Feasibility. Are the goals attainable? Do proposed actions lie within the range of capability of the educational system? Are costs related to and bounded by importance of outcomes?

The question arises as to who should apply these largely judgmental criteria. Educators within the system experiencing the need are more likely to be familiar with all aspects of the problem and to be concerned about the effectiveness of the definition of the problem. Educators from other systems are not as likely to be biased from their previous involvement in the problem, and may have had experience with similar problems. Experts who specialize in problem formulation and evaluation might serve best, but it is not now clear whether such persons exist.

C. Practical Consequences. Since problem formulation is a means, not an end in itself, ultimately the most important criteria for success are its practical consequences for subsequent planning, decision-making and action in the educational system. Unfortunately these criterion measures are also among the most inconvenient to obtain. There is often a considerable delay before a formulated problem is acted upon and a further delay before the consequences of such action can be evaluated. Another difficulty is that the quality of the problem formulation is only one of the factors in the complex set of determinants of later actions.

1. Communicating the Problem. One of the most immediate practical consequences is communicating about the problem. If those who define the problem cannot make themselves understood to others concerned, it seems unlikely that any other good will result from the definition.

2. Consensus. If planning and action are to proceed effectively, there must be substantial agreement on what the problem is among those persons involved in the planning. If the problem is well defined and the statement communicates well, it should be easy to locate and isolate the specific points on which there is disagreement about the

nature of the problem. These specifically defined differences of opinion may then reasonably lead the group to plan research as a preliminary step rather than to immediately implement a program for solution, if the outcomes are important enough to warrant the cost of seeking more information.

3. Effects of the Formulation on the Following Decision Process. The degree of consensus on a decision or plan of action should reflect in part the adequacy of the preparatory problem formulation. However, it will also reflect the extent to which one plan clearly has more merit than other alternatives. If two or more alternatives have about equal merit for achieving the desired outcomes, consensus will be less likely regardless of how well the problem is formulated.

Two other process criteria which need to be considered in conjunction are: (a) time required to reach a decision, and (b) the number of alternative actions seriously considered. In general we would expect that the more solutions that are considered and the less time it takes to consider them, the better the problem formulation. Combining these two criteria into a ratio (e.g. number of alternatives considered per hour) helps avoid the extraneous effects of variation in overall time and effort given to a problem as a function of its importance. Like consensus on a plan, these criteria are also affected by the equivalence of alternative plans, in ways that are hard to predict.

4. Success of Action. This type of criterion comes closest to being the final payoff of good problem formulation. The criterion can be an absolute measure of the extent to which specific objectives are achieved, or it can be a relative measure indicating how nearly the best of all possible alternative actions was chosen. A practical, relative measure might be the number of regrets expressed by educators in the system that some other foreseeable alternative was not chosen. Absolute measures are best applied to specific, quantifiable objectives such as a one-year increase in average reading grade placement level. Less direct measures of success are increase or reduction in rate of occurrence of problems similar to the one formulated, and the satisfaction that the need has been met expressed by parents, citizens, board members, educators, students or other concerned groups. If a problem formulating system were applied to most or all of the needs encountered by an educational system during a given period of time, it would be reasonable to assess the effectiveness of the problem formulation system by some estimate of the total cost effectiveness of the school system in meeting its objectives. In most school systems this would require as a first step spelling out the educational objectives of the system.

Exploratory Problem Formulation Interviews

Our strategy was to explore through individual interviews what functions should constitute problem formulation before trying to maximize the social arrangements by which these functions are achieved. Early in our exploration we found that problem formulation is a many-splendored thing. So much so in fact that we were overwhelmed by the number of alternative directions the process of definition can take. The most invariant features of the entire set of possible processes seemed to be the component parts of the product which might result from the process. We therefore chose to structure our development of problem formulation techniques around obtaining key elements or parts in the product itself. More specifically, we sought to confirm and refine the rational elements of a problem as discussed above and to decide how the process of obtaining these elements should be guided.

Do all well defined problems share the same basic elements? We approached this question first by role playing interviews in which one staff member played the problem formulator and another staff member played the role of an educator experiencing a particular need as described in one of the 1,000 or so critical incidents obtained earlier. The four staff members involved switched roles occasionally and tried this procedure with 20 or 30 different critical incident cards as source data. We then individually interviewed ten teachers and administrators from nearby school systems. From these explorations we concluded that there are about five basic elements (those described above) useful to the definition of any problem arising in an elementary or secondary system. The most undependable of these five elements was "the present condition". The amount of relevant information concerning causes, history of previous actions, limiting factors, etc., varied considerably in kind and quantity.

We wondered whether it mattered in what order the basic elements were obtained, but for the most part it did not appear to matter much. We had supposed that too early a consideration of solutions might cause closure of thought too soon. Maier (1967) found that in problem solving groups, closure, commitment or decision tends to be remarkably stable and predictable from the number of valuative statements made about solution alternatives. That is, a decision tends to be reached about 85% of the time when the number of favorable statements exceeds the number of unfavorable ones by 15, regardless of the group size or problem. However, the problem formulation situation is somewhat different. It is easy for the formulator to redirect attention from a solution to objectives by merely asking why a proposed solution is wanted. If the goal is limited to defining the problem, no one expects a decision to be made, so there is little pressure against returning anew to a discussion of goals. For this reason, having problem formulation occur at a separate earlier time than decision on action may be a good technique for preventing premature closure on a particular solution.

In problem formulation early discussion of solutions may thus waste some time if the solutions are not germane to the outcomes finally selected as important. This does not seem like a serious drawback, and since people are so inclined to think about means and actions and may even be thus stimulated to think better about other aspects of the problem, curbing their natural tendencies to do this hardly seems justified.

During our early interviews, we started to list all reasonable steps a problem formulator might take in order to obtain the basic elements, and the cues which would indicate when to take these steps. A partial list appears in Figure 1. The intent was to develop such a list into a check list that could be used during problem formulation to systematically guide what has heretofore been a completely intuitive process. However, it soon became apparent that a reasonably complete listing of feasible steps and cues would be too complex to guide an ongoing discussion. If a computer were to guide the formulation process the logistics of this approach would be more feasible. However the fundamental weakness which this would not solve is that too little is known about what actions are really most appropriate and what their cues should be in order to obtain the key information needed.

This brings us to the most critical issue of all in developing a system for problem formulation. Unfettered intuition is still probably the most effective way to define a problem. A system which spelled out in detail the steps to be rigidly followed by a formulator would undoubtedly interfere with this intuitive process. Until that remote day when the appropriate problem formulating steps can be spelled out exhaustively for all types of educational problems, a practical problem formulation system should make the most of intuition, rather than try to suppress it. Probably the main failing of intuition as a guide to problem formulation is that the most appropriate step to take at a given moment fails to occur to the formulator as a possibility. Congruously, the main advantage of a systematic procedure is reliability; if certain kinds of information are essential the system insures that these are obtained.

We considered several ways of trying to combine system and intuition optimally.

1. It is not uncommon that a system which has been designed intuitively is expected to be carried out rigidly and mechanically when put into operation. This seems to be the least promising combination.

2. One can spell out the steps which might be expected to work best most of the time but permit the formulator to depart from this program on an intuitive basis whenever

FIGURE 1

Cue	Action by Formulator
A symptom or need is identified	Ask what outcomes are most desired from any change.
Outcomes compete or are inconsistent	Get priority ordering of outcomes.
Outcome has hidden costs or consequences	Check consistency of outcomes with values.
Outcome resembles a solution	Ask why outcome is wanted.
Outcome stated generally	Ask for kinds of evidence of outcome.
Evidence of desired outcomes is agreed on	Assess present condition.
Previous efforts have failed	Ask why. Which factors are still present?
Disagreement an obstacle to action	Who or how many? Who controls decisions?
Outcomes and present status clear	Get ideas for actions or solutions.
Solution ideas all conventional	Ask for wild ideas. Explore implications of extremes ("What would happen if...")
Solution ideas exhausted	Evaluate solutions, locate information gaps, pose research questions.
Questionable premise	Challenge it.
Vague or rambling statement	Restate simply and ask for verification.
Seemingly irrelevant comment	Ask for clarification of relation to the problem.
Perseveration on an idea	Record idea visibly and ask for other ideas. Shift to a new element.
Lack of rapport, noncooperation, conscious digression	Re-examine purposes of inquiry. Find common goals. Point out useful functions of interaction.
Information gap	Identify best information sources. Weigh cost of search against value of information.
Problem definition looks complete	Apply criteria to determine what is lacking.

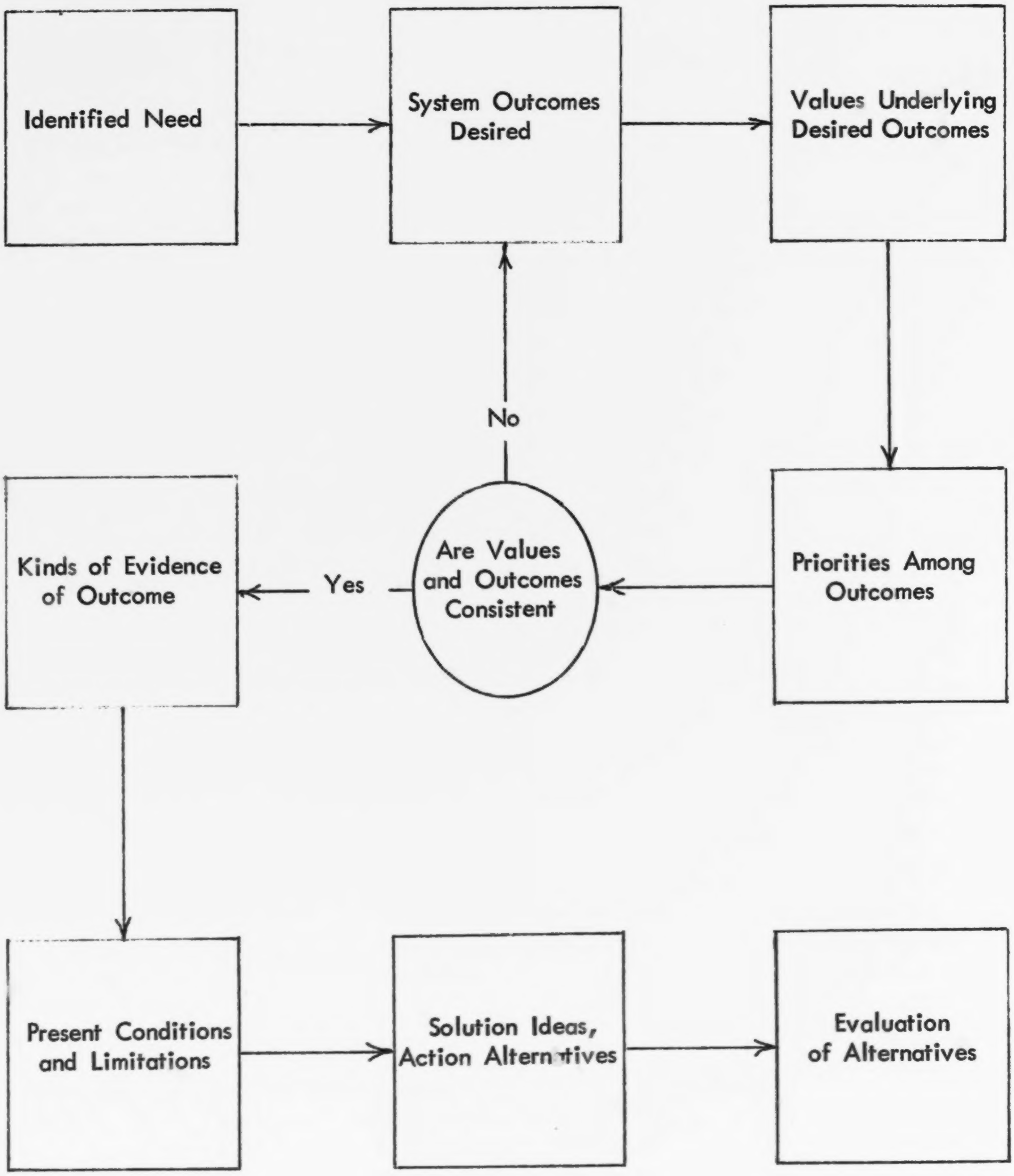
his judgment indicates some better course of action. For example, the flow diagram in Figure 2 shows a fairly simple set of steps to be followed to define the key elements of the problem, with each obtained element serving as a cue for the next step.

3. Instead of being guided by the "best procedure" the formulator could have in hand a check list of cues and appropriate steps as illustrated in Figure 1. He could use his intuition freely but have the check list to refer to as a reminder of some important step that he might otherwise miss. However, in practice we found the check list too demanding and distracting from the task of interpreting information obtained from the educator in an interview situation. If the formulator could use his intuition freely during an interview with an educator, subsequent to each interview he could at his leisure examine the information obtained to date and compare it with a check list of needed information. This comparison could then be used as a basis for structuring the next interview. If the formulator were sufficiently skilled or the check list sufficiently short, the time intervals might be condensed so that the whole process was accomplished in a single interview with an occasional break for the formulator to review his check list.

One of the dangers of any systems such as those just described is that, through repeated use of a fairly prescribed set of procedures, the formulator's ideas and expectations about educational problems will be routinized into fairly narrow channels. A routine formulation process may thus miss some key leads to a new kind of problem-defining activity. This brings to light a paradox concerning who is the driving force behind the whole inquiry. If an outside formulator initiates the process, as we necessarily did in this project, the educator experiencing the need naturally expects him to structure and guide the process on the basis of his expertise. Hence the educator tends to play the role of passive provider of information rather than equal partner in formulating a problem. Yet the educator presumably should define the purpose of the inquiry, and the purpose should guide the process. The paradox is aggravated by the fact that educational problems are so diffuse and overlapping. For example, in spelling out what outcomes are desired, the educator may name objectives which are quite important to the system but which are not closely related to the need initially identified. If the formulator notes this discrepancy he can ask the educator whether he is off course or really wants to shift to a different problem that is perhaps more important. It is especially easy for them to get off track if the outside formulator has initiated the whole inquiry since he is directing the process, yet does not know what the problem is. On the other hand if an educator

FIGURE 2

FLOW CHART OF PROBLEM FORMULATION STEPS


Identified Need
System Outcomes Desired
Values Underlying Desired Outcomes
Priorities Among Outcomes
Are Values and Outcomes Consistent
No
Yes
Kinds of Evidence of Outcome
Present Conditions and Limitations
Solution Ideas, Action Alternatives
Evaluation of Alternatives

initiated the contact because of a pressing need he wished to have formulated, it is much less likely that he would allow the inquiry to get off course, especially if he were paying for the service. Zeroing in efficiently on a problem may therefore be enhanced if the person directing the process establishes the objectives as quickly as possible.

Systems and Social Patterns of Problem Formulation

What is needed, it seemed from our exploratory interviews, is a system which will obtain the five components of information described above in any order or manner which permits the participants to make the maximum use of their own ingenuity to relate the problem components into an integral whole. It appears that the bulk of the formulator's work consists of gathering information. The ways in which he thinks about this information and helps to integrate it into a defined problem may be as critical but are not as time-consuming as collecting and verifying the information. If the information desired is recorded or already known by someone it is typically much more economical to obtain it by inspecting a document or asking someone than by trying to observe the educational environment directly and infer this information from observation. Even when personal bias is likely it may be more efficient to ask two or several individuals for the information independently rather than to obtain it by observation. The best strategy would seem to be to reserve for direct observation those information needs which the educators of the system cannot supply.

In imagining optimal problem formulation systems we had envisioned the possibility of trying out a complex multi-stage attack on a problem in which individual and group interviews, direct observation, literature and document search, and other activities were used in series or combination with intermediate steps of summarizing and evaluating the data. Trying out a system of such a complexity turned out to be clearly beyond the scope of the present study. Our tryouts and evaluation focused on the initial intensive effort to formulate problems through verbal interaction. In retrospect this did not change the essential qualities of the problem formulation. Extended searches for information which might have been incorporated in a more complex system were rather considered as alternative actions to be weighed in a decision following the problem definition.

With thought and verbal interaction as the main activities of problem formulation there still remains considerable freedom to choose among social patterns. Our early explorations had consisted of individual interviews. Small groups structured in various ways present feasible alternatives. Brainstorming groups, in which ideas are recorded as rapidly as they can be thought of by members of a group and no criticism or evaluation takes place during the idea generating session, has been widely promoted (Osburn, 1953; Clark, 1958). However, carefully controlled studies (Taylor, et al., 1958;

Dunnette, et al., 1963; Parnes, 1963) do not support the superiority of group brainstorming to the summed individual efforts. In all, the results from comparisons of small group and individual problem solving are not conclusive (Zagona, et al., 1966). Individual interviews may also permit greater confidence and security in revealing socially touchy but important factors in a problem. Maier (1967) suggests the following additional disadvantages of groups:

1. Social pressure for conformity may stifle good ideas.
2. One individual may dominate the group.
3. Winning an argument may be valued more than the defining of the problem.

What then might be the advantages of small group problem formulation over individual interviews? The main advantage suggested by our explorations is that in a group it is easier to focus interaction on goals and problems of the educational system rather than those of the particular individuals who are participating in the formulation. In individual interviews discussion frequently and naturally seemed to drift toward the concerns of the individual educator and his role in the system. Sometimes these personal concerns translated easily into system needs and sometimes they did not. Other advantages of groups are suggested by Maier as follows:

1. A group brings a greater sum total of knowledge to bear on the problem at one time than do the individuals working separately.

2. Individuals tend to get into ruts in their thinking. Group members can knock each other out of these ruts.

3. Participation in working on a problem increases acceptance of decisions about the problem. Thus a problem definition adopted by a group is likely to have better acceptance at least within the group than a definition which springs full-blown from a single individual.

4. Members of a group are likely to comprehend a decision (or a problem definition) better as a result of group discussion of the problem. Individuals working separately would not get the benefit of this discussion.

In many respects the success of group problem formulation probably depends on the skill of the group leader. If he can keep the group task-oriented and free of personal or interpersonal concerns the product is likely to be much better. Some of the personal or interpersonal concerns most likely to get in the way are proving one's own competence, trying to please the management, trying to avoid responsibility, scapegoating and veiled aggression, and fear of failing or appearing foolish. A critical difference here is that conflict and dissent be treated as a source of useful ideas rather than as occasion for hard feelings. Hoffman, et al. (1962) found that in group problem solving the quality of solutions was greatly increased by encouraging subordinate members to openly express and discuss their disagreements with the suggestions made by an authority in the group.

The leader can keep the group on track and minimize tangential discussion. On the other hand if he is too directive he may inhibit the contributions that individual group members could make. Maier (1967) concludes that the leader should serve mainly to integrate information and enhance communication, and that his direct contribution of content or evaluation should be minimized.

The product of a group problem formulation depends ultimately on the quality of the individual member's contributions. Involving the educators in the task who are best able to define the particular problem is doubtless a critical factor. In order to bring the maximum amount of relevant information to a group effort, it seems wise to compose the group of persons who have specialized knowledge or familiarity with the problem. There is also evidence (Hoffman, 1959; Tuckman, 1967) that groups which are heterogeneous in other respects may perform better. A review of other variables relevant to group effectiveness in problem solving has been provided by Zagona, Willis and MacKinnon (1966).

Experimental Comparison of Three Types of Group Problem Formulation

The small group situation appeared to have enough advantages for problem formulation that we decided to compare three basic types of group problem formulation. These types differed on the extent to which the task was structured to obtain the rational elements of a problem described previously, and on whether the process was directed by an "outside expert" formulator or not. In one condition the groups had neither structure nor direction, in another the groups had structure but no direction, and in a third the groups were both structured and directed by an outside formulator. All problem formulations were evaluated later by other educators from the same school system.

Method. In one elementary district, the group problem formulation procedures were first tried out and informally compared with a "detective" technique involving individual interviews and classroom observations by an outside formulator. Very similar kinds of problem data were obtained by the two approaches. We then made arrangements with three school districts (two unified, one secondary) to try out and compare the three group procedures. The districts were asked to participate only if they had actual educational needs which they would like to have better defined for the benefit of the school district, rather than just as a matter of research interest. The administrative leaders of the district therefore chose problems to be formulated which were actual needs of the district.

In each district the experiment was replicated twice so that there were six sets of three groups in all, and three persons in each group. In two districts the three groups which were compared analyzed the same problem, and each set of three groups took a different problem. In the other district, method differences were confounded with problem differences in that each of the three types of groups analyzed a different problem. In the latter district administrators and district staff made up one set of three groups while teachers made up the other set, whereas in the other districts each group within a set represented a heterogeneous combination of three members of the faculty or staff. The three districts, widely separated geographically, represented three types of population densities: suburban metropolitan, small city, and rural.

All groups were given a brief general orientation which included the following:

1. Verification that each member was interested in the problem.

2. A brief description of the project from our point of view.

3. Assurance of confidentiality where requested.

The three types of groups met in separate rooms and were given two hours for the task of problem definition. Actual times varied from one and a half to two and a quarter hours. Each group was instructed as follows:

Group A (unstructured). The group was told to organize and carry out the task in any manner they saw fit. A booklet of blank pages for one member to record the group product on indicated only that problem definition included consideration of possible solutions. Each member was handed a half-page of printed guidelines which is shown in Appendix C. They were told that we did not intend the recording secretary to be considered the leader in any other sense. The group was observed from time to time by an experimenter who was allowed to answer questions about method but not to make any other contributions.

Group B (structured). These groups, like the A groups, were assigned a recording secretary (whoever volunteered) but not a leader. They were asked to focus their activity on providing the following basic elements of a problem definition:

1. The need as initially identified.

2. Desired outcomes, and for each outcome the reasons it is desired and what evidence would be acceptable that it was achieved.

3. Previous actions.

4. Limiting factors.

5. Possible solutions with pros and cons.

6. Possible immediate steps.

The actual form on which this information was recorded and the guidelines handed to each member for using it are shown in Appendix C. The group was observed part of the time by a nonparticipating experimenter as described for Group A.

Group C (structured-directed). These groups sought to provide the same elements of a problem definition as the B groups. However in addition to the three regular group members one of the experimenters served as group leader and recording secretary. He concentrated mainly on eliciting comments from all group members, especially those in subordinate roles. Everyone's ideas were treated equally. He also summarized and recapitulated what was said by the group and contributed content himself.

The hand-written notes taken at each group meeting were elaborated into more complete statements and typed. This editing process required one to three hours for each group protocol and generally resulted in longer problem definitions for the structured-directed groups (C) because the experimenter could recall more of what took place and of course could elaborate his own thoughts more easily than those of others. A sample set of three problem definitions, titled "Problem Analyses", one from each treatment group, is shown in Appendix D. The typed problem definitions were mailed to each of the participants, each person receiving the definition produced by his own group. In addition, two top-ranking members of the staff from each district who did not participate in problem formulation received the problem definitions from all three types of groups. The definitions were numbered and stacked in random order and the experimental treatments and names of participants were not identified, so that evaluations would be blind.

Evaluation Results. Each participant and each independent evaluator was asked to study the problem definition(s) received and then to evaluate each one frankly by answering the questions listed in Table 2. Frequencies of each type of response from the twelve questionnaires completed by independent evaluators are shown for each question. The open-ended questions (#4 and #7)

TABLE 2

Frequencies of Different Responses by Independent Evaluators

Ideas About What Actions to Take Next

1. How many different actions were considered as possible solutions to this problem for the first time in this analysis, as far as you know?

Treatment Group	Number of Actions 0	1	2	3	4-5	6 up	Pooled Sum
A	7	2	1	1	1	0	11
B	7	4	1	0	0	0	6
C	5	0	0	3	3	1	30

2. (If the answer to No. 1 is not zero) How many of the actions in No. 1 are at least as promising, in your opinion, as the best action suggested before this analysis began? (Consider both quality and cost in your answer.)

Treatment Group	Number of Actions 0	1	2	3	4-5	6 up	Pooled Sum
A	9	1	1	0	1	0	8
B	8	3	1	0	0	0	5
C	7	0	4	1	0	0	11

3. Has the analysis led you to change your evaluation of the relative merit of different solution ideas?

	Yes	No
A	1	11
B	0	12
C	7	5

4. Do you know of other promising actions not mentioned here? If so, please list them below: (Number who listed one or more actions for each treatment group: A-7, B-6, C-6).

TABLE 2 (Continued)

Definition of the Need or Problem

5. Disregarding ideas on "what actions to take", which phrase below best describes the effect of this analysis on the definition of what the problem is?

Treatment Group A	Treatment Group B	Treatment Group C	
2	1	1	much clearer now than before
4	2	8	a little clearer now than before
5	9	3	about as clear now as it was before
1	0	0	less clear now than before

6. Has the analysis yielded any new worthwhile ideas of the following kinds?

Treatment Group A	Treatment Group B	Treatment Group C	
2	4	7	What the objectives of any change should be
2	1	3	Underlying reasons for wanting a change
2	1	5	How this particular need relates to other needs
0	1	3	Causes of the problem
1	2	2	How to evaluate the success of any action taken
1	0	3	Reasons why previous actions may have failed
0	0	1	Other
8	9	24	TOTAL

TABLE 2 (Continued)

7. List all other things which need to be known or clarified before a sound decision could be made as to what step to take next.

	Number of Things Listed				Pooled Sum
	0	1	2	3	
A	4	4	1	3	9
B	5	2	1	4	15
C	4	2	4	2	16

did not differentiate the groups at all. Answers by the independent evaluators to the other five questions clearly favored the structured-directed (C) groups. On all but one (#2) of these five questions, differences among the three groups were statistically significant at $P < .05$ or beyond when a chi-square test was applied to the frequencies pooled across all independent evaluators. On Questions 1, 2, and 5 Group A was superior to Group B (no separate statistical test) while on Questions 3 and 6 Groups A and B were rated essentially the same.

About two-thirds of the participants in the problem formulation groups returned completed evaluation forms. Although the participants rated their products somewhat higher across the board than the independent evaluators as might be expected, the relative standings of the three treatment groups were in substantially the same order for the participants as for the independent evaluators.

The main result seemed to be that effectiveness of our structured approach to obtaining the basic elements of the defined problem is dependent primarily on the direction and contribution of an experienced problem formulator. Without this direction and with educators untrained in problem formulation our structured technique was probably actually slightly inferior to letting a leaderless group attack the problem in a completely freewheeling unstructured way. This experiment cannot tell us whether the directed groups' superiority was due mainly to the formulator's direction of the process or to the content he contributed, or both. Nor can we say how other trained problem formulators would fare in comparison.

Looking again at the absolute response levels, especially for Questions 5 and 6, it is clear that none of the problem formulation methods worked miracles. On Question 5 most evaluators of Group C definitions indicated that the problem was a little clearer. With the Group B definitions, the problem was about as clear as before, and with Group A definitions, about half way in between. On Question 6, "What the Objectives of Any Change Should be" was the only category on which over half of the independent evaluators indicated that new worthwhile ideas were suggested. Perhaps this degree of accomplishment is about all one can expect from three people in two or three hours of initial effort on a problem, no matter what technique is used. In the absence of some dramatically better technique, how long would it take to add significantly to the completeness of the problem formulation we obtained? Quite a while, is our impression. In one of the three districts where the experimental data were collected, in addition to the time spent in regular data collection, approximately one day was spent interviewing others who were familiar with the two problems analyzed and observing classrooms. These experiences largely confirmed what was learned during the experiment itself but did not add important new dimensions to the problem definitions. It seems that what is already known or thought out by the educators in the system can be spread out on the table fairly quickly, but digging out new information and designing new approaches are slow laborious processes.

Implications for Training The contrast in results between Groups B and C suggests that carefully designed training in problem formulation might substantially improve educators' problem defining skills. We examined the content of the Group B protocols to see whether omission or misinterpretation of one or two elements of a definition might account for their lower evaluations. No one element seemed to be grossly misunderstood, but many of the groups paced themselves badly and had too little time for the later elements. The participants did supply each of the kinds of information asked for in Group B, although it was sometimes stated too generally and occasionally was only marginally relevant to the outcomes desired. "Evidence" tended to be long term consequences of achieving an objective rather than immediately applicable measures of it. But this too is valuable information and this subtle difference was not stressed in orienting the groups. In the unstructured A groups, nearly all of the information provided could be categorized as either causes of the problem or possible solutions. The sample protocols in Appendix D illustrate some of the above differences.

Training to use a structured problem formulation technique such as we employed should probably focus on at least two skills: reviewing specifics and formulating research questions. If specific outcomes sought were reviewed in detail as a stimulus to thinking of possible solutions, the tendency to address the problem in terms too general might be reduced. It was probably largely the fault of the way our form structured the procedures that the resulting formulation did not contain more research questions to be answered. Perhaps there should be an explicit step in the procedure which requires the participants to locate critical points of ignorance. Such points might indicate which outcomes are farthest from being achieved and what are the pivotal features of any proposed solution. More emphasis on posing such specific questions would probably lead the participants to propose immediate steps of search or research which would provide a better basis for later decisions between alternative solutions.

Promising Directions

Whatever approach is taken to problem formulation, two processes seem to be fundamental in it: generating ideas, and evaluating ideas. The conditions which facilitate these two activities appear to be fundamentally different. Idea generation is enhanced by a climate which accepts all contributions, encourages wild imagination, and takes any contribution as a stimulus for other constructive contributions rather than an object to be evaluated. Evaluation, on the other hand, seems to be helped by a realistic sense of responsibility for consequences, facing the facts in a hard-nosed way, and systematic procedures which insure that critical variables are accounted for. It would seem wise to separate these two processes temporally, but there is some question as to how much this can be done in problem definition without arbitrarily fragmenting the entire inquiry. As recommended in brainstorming and related group techniques (Maier, 1963), it may be wise to get all ideas for solutions expressed and recorded before any evaluation of of solution ideas takes place. Would this same tactic work for the other elements of a problem definition such as outcomes, evidence, and present conditions? Or would the main result be to generate a lot more irrelevant content?

If idea generation and evaluation can be separated effectively, perhaps the persons who serve these two functions should be chosen independently. We have no reason to believe that idea generation and idea evaluation are highly correlated skills. Idea generation and idea evaluation are somewhat analogous to divergent and convergent creative thinking respectively. Guilford, et al., (1961) found that interest in divergent thinking and interest in convergent thinking emerged as independent factors (slightly negatively related, in fact) from a factor analysis of 40 measures of temperament, interest and thinking.

The distinction between idea generation and evaluation applies to need identification as well as problem formulation. That is, there are always various ways in which a school system can be improved. Generating ideas about such needs is one thing; deciding which have the highest priority and deserve to be formulated as problems is quite another.

Although our studies were limited to data provided by educators, we highly recommend that any practical problem formulation system include students, parents, employers, scholars and other citizens. Lack of communication among these groups is the source of a good many educational problems in itself. As discussed earlier, there is no reason to suppose that younger persons or those having less status in the community will contribute any less to the task of identifying needs and defining problems. Amos and Washington (1960) found that students were better able to identify classroom behavior problems than were their teachers. For idea generation, the representation of more diverse viewpoints produces more cross fertilization of ideas as well as a greater number and variety. In evaluating ideas, all groups who are going to suffer the consequences of any action deserve to be in on the initial formulation, and this certainly includes all the groups mentioned above.

How to implement a system which utilizes such diverse groups efficiently is certainly a challenge. Face-to-face meetings are especially hard to arrange, and though a certain number might be necessary, this number could be minimized by relying on other communication media such as mail and telephone. Systematic sampling of each population group seems preferable for evaluating ideas, but for idea generation public appeals for voluntary contributions should serve just as well.

Our results suggest that the process should be organized and directed by someone who has acquired special skill in formulating educational problems. The future availability in sufficient number of outside experts for this purpose is uncertain, so it is practical to consider who might perform this function within the school district or county. The skills required would logically seem to fit the position of director of research and planning. An increasing number of school districts in the nation are including positions similar to this on their staffs. Often a great deal of time and effort in problem formulation could be saved by including as participants outside specialists and educators from other school districts who may already have struggled through similar problems.

Having the problem identification and formulation process directed and organized by a specialized central facility which could serve a wide region has some advantages. Specialized expertise and knowledge could be called upon more readily and coordination among districts, counties and states might be facilitated. The competence and efficiency of the central facility's staff would probably be enhanced as their experience with a large number of problems in the region grew. There is considerable overlap among various educational problems in both content and structure. Sarason (1961) has discussed how cumulative experience with human problems leads to growth in skill in dealing with subsequent problems.

On the basis of its experience and regular communication with other information storage centers, a central facility could compile a useful file of problems. The critical incidents which we have collected and classified could be part of such a file. Educational problem files could be used in several ways:

1. A consulting problem formulator could use them as a job aid, referring to them for ideas which might be applicable to formulating a problem in a particular district.

2. If problems, solutions and other material pertaining to each problem were cross indexed, an educator wishing to find out more about a particular problem could retrieve useful information from the central facility's file.

3. Periodically a list of problems encountered could be reproduced and mailed to all school districts in the region. Educators could then scan this list for new ideas as to what should be improved in their school. They could then request more information as described in No. 2 and/or proceed to get the problem formulated more clearly in their own district.

We have dealt mainly with a situation where a need is identified and the problem formulation effort concentrates on that single need. But there is much to recommend in a multi-problem approach. Proposed actions typically have a bearing on several problems, even though they may have been inspired by a single need. Treating the problems in conjunction provides a more rational basis for decision. If the total set of objectives within the educational system is spelled out and examined, priorities among problems may be established so that small problems are not beaten to death while larger ones go unattended.

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APPENDIX A

Form used to collect critical incident data. Only the first two pages of the form are shown. The third, fourth and fifth pages were essentially identical to the first page. On the final page general comments on their educational system were invited.

Position______________________________ F-72

INCIDENT FORM

First, would you try to remember a specific thing happening recently which made you feel that something about education here needed improving. Please recall one single event or one observation of some condition.

When did this happen or when did you observe it?________________________________

Where or under what conditions did it happen?___________________________________

Exactly what happened?____

(for the 3 questions below, write only information not already given above.)

What led up to this event or condition?____

What, if anything, could have been done to prevent it?___________________________

What other undesirable effects, if any, would you expect to result from this event or condition, or from its causes?____

Now please recall and describe a recent event which made you feel that education here was working especially well in some way.

When did this event or observation occur?

Where or under what conditions did it happen?

Exactly what happened?

What led up to this event or condition?

What is the main good effect you would expect in the long run from events of this kind?

APPENDIX B

Samples of Critical Incidents

The following excerpts have been selected from the incidents in each category. The entire report is not quoted. The selected part typically is in answer to the question on the form "Exactly what happened". All excerpts are literal quotes, with the exception of a few parenthesized additions.

Category	Position of Respondent	Excerpt
I 1.1	Elementary teacher	One of my students is extremely emotionally disturbed and, in my view, should not function in a normal classroom a full day. We discussed the possibility of entering him in a class for emotionally disturbed children and much to my dismay, we learned that he is too "smart" to qualify. He should have had psychological help long ago. No one ever had him tested before this year.
I 1.1	Teacher	This situation occurs with a child who has an emotional problem over which he seems to have no control, consequently he melts into a pool of tears. The other children pick on him just to stir up a reaction. I feel there should be help provided through education for a child with this type of problem when the parents are not in a position to afford it.
I 1.2	Math teacher 6-7-8th	As I was reading answers to correct a math assignment I noticed not one but several students changing answers. I called this kind of behavior to the attention of the class and we had a discussion about the problem. The general feeling seems to be that it is O.K. to cheat if you don't get caught, and if you get caught, there isn't anything so bad about cheating anyway since everyone does it.
I 1.2	Business staff	Students wrote smutty language on lap boards, raised disturbances, and generally destroyed the equipment. Conditions were so bad these students were removed from the theatre. An extensive cleaning was required.

Category	Position of Respondent	Excerpt
I 1.3	Counselor	Some students find it necessary to repeat courses in summer schools, (which) they should never have flunked in the first place. Their ability is such that they should have no difficulty in passing the courses. Two students in question didn't really seem to care whether they passed or not.
I 1.3	Band instructor	One of my drummers who had been diligently rehearsing with the marching band did not show up for the half time show but was later seen in the stands with a date. Total lack of responsibility (was) shown and the boy didn't feel that what he had done was so wrong. (We) must teach students early that teacher demands respect and the deviation from rules brings swift and severe punishment, especially first offence.
I 2.1	Administrator	The reading teacher was so engrossed in providing love and affection to the eighth grade youngsters that she lost totally any administration or structural direction for the program. The children had fun but were not learning.
I 2.1	Math teacher 6-7-8th	During a lesson in logic a question was posed for discussion. There was nothing but silence. Being impatient to move along I answered the question myself. Later in the period I realized that I was doing the same thing again. The teacher should have been better versed in techniques of group discussion and more willing to let the student make mistakes.
I 2.2	Elementary teacher	Children are placed outside the room by the teacher. There they do nothing but stand around, play, etc. Another solution other than exclusion from the room would have been more satisfactory. Many teachers think this solves the problem.
I 2.2	English teacher	As I walked down the hall to my fifth period desk in the hall to supervise passing of lunch students, I see the students in Mr. X's room sitting at their desks, books closed, conversing with each other. Mr. X is standing further down the hall, talking with some students about the price of stock. As I assume my position of hall-watcher, Mr. X concludes his conversation about stock and begins a conversation with me about rearing children. Mid-way in the period, he moves to his door and shouts at his students to shut-up and read, or else. The remainder of the period he spends standing at the door.

Category	Position of Respondent	Excerpt
I 2.3	Librarian	One teacher when given an inventory sheet (texts titles are typed) was rather angry at being asked to count his books. He assigned students to the task. The figures were inaccurate and took much of my time to re-count the books. When this was pointed out to him, he very flippantly stated that it wasn't important, and that he had the students do it. The same type of "I-don't-care" attitude must effect the teaching situation in the classroom and will eventually be transmitted to the students.
I 2.3	Principal	A cooperative program with the University to give students who are members of an educational organization an opportunity to help as volunteer aids in the classroom included a schedule giving each student a chance to visit the different grades. One particular classroom teacher, without consulting the principal, arranged to have the volunteer stay in her room and put in extra time there. This teacher has frequently used every possible method to get other people to do her work and left her children with other teachers whenever possible. The principal was in an awkward position because she did not want to put the volunteer in a bad position when it was not her fault.
I 3.1	Reading teacher	(In) planning the FEAST program for next year, (we found) that the majority of students being counseled into the program were potential drop-outs as though this were not a special interest or opportunity for them but a last resort as a way to get them through high school.
I 3.1	Superintendent	Board member had complaint from local citizens and his son on getting advice from Senior High School on entrance requirements for college or university. When citizen was asked did he speak to son's counselor--he replied "They don't know answers"--this is a recurring problem in that counselors don't seem to be able to answer parents request.
I 3.2	Intermediate teacher	I requested some chemicals or information as to where to obtain them. We were supposed to be able to obtain them in any drug store which, it turned out, we were legally not allowed to. The science program specialist was completely unaware of the properties of this chemical and informed (me) that that was my problem!

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Category	Position of Respondent	Excerpt
I 4.1	5th grade teacher	As teachers, we have no say as to text books chosen, or curriculum planning. I don't presume to advocate that this should be strictly up to teachers, but since we work directly with the children, I think some consideration should be given to our suggestions. In other areas, teachers' review new teaching devices, aids, and books and at least make suggestions and comments for the curriculum directors and text book committee. We have one or two persons who dictate curriculum and text selection for the whole county.
I 4.1	Assistant Superintendent, business	The (Negotiating) Council expressed its concern that the Superintendent had not allowed them to openly discuss and to suggest solutions to the administrative reorganization of the district. They accused the Superintendent of already having his mind made up before it was brought up for discussion in the council meeting. They accused him of talking too much and not listening to what they had to say. The Superintendent could have asked for recommendations before formulating his own plans. This would have eliminated the feeling that they had not been listened to.
I 4.2	Teacher	Administrator wanted to prevent boys from wearing longer hair than the desired close cut. Shirt tails must be tucked in, etc. A ridiculous policy was suggested. It read "Boys' hair should not come down longer than below eye on side of face". (This results from the) authoritarian nature of some principals, "to get the kids".
I 4.2	Math teacher	Assembly schedules are drawn up by administration in such a way that very often a whole period is cut out of the schedule. Thus the students in 3rd period may not have any 3rd period class on a given day. During the school year, this same group may miss 7 or 8 3rd periods of instruction.
I 4.3	Vice Principal	The High School (and this includes the whole faculty) had permission from the Board of Education to try flexible modular scheduling. Before we went into this program we were given one-half time counselor over and above our regular assigned counseling load, one half-time extra secretary and 30 hours of extra teacher aids. After we have agreed and everything was set up for this we now find that the Board of Education or the Administration downtown has cut the budget and we may not get this extra personnel to help us with out program.

Category	Position of Respondent	Excerpt
		This item (should have been) in the budget before we committed ourselves to this type of program.
I 4.4	Industrial arts teacher	There has been friction between dean of students and principal.
I 5.1	3rd grade teacher	A child was poor in attendance, came without breakfast, slept in class, lived with his mother, a divorcee who worked nights, and other obvious home reasons for poor school performance. As a teacher there was so little one could do to help. The child needed psychiatric help as well as improvement in living conditions. The mother lavished affection on the boy's sister who was more attractive and successful in school.
I 5.2	4th grade teacher	Mother came to school during day for conference She interrupted regular procedure, chased child around room in an attempt at punishment. She also berated teacher and refused to cooperate with school authorities.
S 1.1	Chairman, Department of English	A teacher from this' school tried to get a unit of her composition introduced into a developing guide for a new course and experienced what amounted to rejection. (There is a) tendency to keep course development too restricted, promoting rigidity.
S 1.1	Social Studies teacher	I'm beginning to question if we really need to offer as many years of Advanced Courses in Math and Foreign Language as we do. I would encourage a much wider preparation in humanities courses, art, music and literature--of business--typing and possibly shorthand--for college or even for support if marriage caused a change in plans. Few if any State colleges require 4 or 5 years of Math and Foreign language and three years of lab sciences.
S 1.1	Band instructor	I have observed that only 10% of my band students take music lessons. Where the Hell are the arts going? There is no opportunity for students in my district to find time during school for me to give lessons. The education system is turning out robots and encyclopedias and the beauty is being turned aside for Physical Ed. and driver training. With the class load the way it is and the lack of interest or guidance by parents and the college requirements getting tougher all the time, there is no way to educate our people in the beauty of life. There is not even a music appreciation course taught so that

Category	Position of Respondent	Excerpt
		they can be made aware that there are other forms of music than Rock and Roll. Society will suffer in the end.
S 1.2	English teacher	(There are) interruptions of normal class activities and teachers' preparation periods for non-curricula activities. As an example, on one day second period is eliminated because of over-long campaign assemblies; the next day third period is shortened for home room and the following Friday it is again shortened for homeroom and seventh period is cut in half for a sports assembly. In addition, some teachers' preparation periods were interrupted for meaningless conferences and paperwork.
S 1.3	School nurse	During the showing of films on human growth, to 5 & 6 grade student boys and girls separately, children were very disrespectful, giggling and laughing to such a degree the presentation had to be discontinued. Children (are) uncomfortable hearing about their bodies, (have a) negative attitude about sex.
S 2.1	Principal	(There is) resistance to change in programs and schedules designed to provide success for children and thus lead to a more positive self image a child has of himself. The present system (is) not getting the job done.
S 2.2	Primary consultant	All children with obvious remedial reading needs were screened for small group instruction. Four sixth grade boys were found to be functioning at the first grade level. Five fifth grade boys were functioning at the second grade level. Three fourth grade boys were functioning at the fourth grade level.
S 2.3	Social Studies and English teacher	Most students must be threatened or forced to do homework. They work for grades only. Most texts do not vary in questions or exercises. They have the same type at the end of each chapter or section. Students tend to read only that directly applicable to the assignment or questions. They skip in their reading all other pertinent information.
S 3.1	5th grade teacher	A boy from our school continually disrupted activities, by agressive acts toward all children on the playground. He had similar problems in the classroom where he was a continuous discipline problem. He was completely uncontrollable, and has continued in recent years. His academic achievement was very low. (There is)

Category	Position of Respondent	Excerpt
		a lack of adequate testing or identification procedures for identifying emotionally disturbed children. This child was obviously emotionally disturbed. It seems a class for emotionally disturbed children should have been provided to eliminate the classroom disruption.
S 3.2	8th grade teacher	Passing the (final) test was supposed to be a criterion for graduation, among other things. But, when students failed the test, they will all graduate anyway. The importance of the test has been stretched beyond its real importance.
S 4.1	Primary teacher	Every day teacher spends 2-3 hrs. correcting workbooks--worksheets, paragraphs in handwriting, English, arithmetic (2-3 groups), reading 4 groups. Every teacher should have an aid available 1-2 hrs. a day for correcting and recording grade.
S 4.2	Principal	Children coming to school by bus are often a problem due to the fact that their schedules are so structured. Children bussed are not able to participate in school activities and are not able to participate in out of school activities. Children may not be kept after school because they must catch the bus. Additional bus transportation could have been provided.
S 4.3	Intermediate teacher	During the year I taught 46 children in a self-contained 4th grade class. It was a heterogenous group with 2 serious discipline and emotional problems. This occurred in a portable classroom with limited space, poor circulation, etc. While I was still able to cover the course of study I feel that because of numbers I, of necessity, was forced to spend too much of my time with two problem children and 13 slower ones to the detriment of the rest of the children.
S 4.4	2nd grade teacher	A 5th grade student who is very intelligent finished his classwork quickly, becomes bored for lack of anything to do and is becoming a discipline problem. (There is a) lack of anything for the gifted child in our district. Offer some type of program for the gifted as well as the disturbed.

Category	Position of Respondent	Excerpt
S 5.1	8th grade History teacher	A teacher was sending home classwork with a student who was to correct the class's work. This thing of sending a class's work home with one student to correct had been mentioned before, but this was the first time it could be found before. The teacher's name was referred to the principal, but nothing was done. The administration of the school does not evaluate teachers closely enough. (We need) a better system of teacher evaluation, where an undesirable teacher can be recognized before they have tenure.
S 5.2	English and Remedial Reading teacher	Teachers of "basic" pupils in English, and Social Studies to some extent, often come to me complaining or asking for information on how to best teach pupils whose reading isn't up to grade level, either because of low intelligence or retardation. Many of these people, with 5 years of college background, have had no training in doing work with this type of pupil.
S 5.2	Administrator Central Staff	Interviews (were) conducted with recently credentialled teachers. The interviewees were asked to evaluate the effectiveness of their teacher training programs in preparing them for their jobs as beginning teachers. Their answers: Inadequate.
S 6.1	Biology teacher	Students cannot be selective about the classes they register for. A computer evidentally does the scheduling and personal contact with the student is at a minimum. A student wants a certain biology instructor who specializes in animals (the students interest) and cannot take a course from this instructor because a computer has scheduled the students classes. A change of schedule at a later date is in order ("red tape").
S 6.1	Business teacher 9-12 grade	Throughout this year there has been no effective system for getting students in their seats when the bell finishes ringing.
S 6.2	Elementary Consulting teacher	There was increasing misunderstanding and general breeding of suspicion regarding the status and operational modes of elementary consulting teachers. Very early clarification of roles would have prevented misunderstanding. A meeting was held, but in the last week of school.

Category	Position of Respondent	Excerpt
S 7.1	Cooperating teacher	For three years the district has had a policy that students may transfer from one school to another provided they get themselves to the other school and don't cause trouble. The result has been that the "better", more capable students have transferred away from the school in the predominantly Negro area. The result has been to decrease the peer group ideal and level of competency steadily.
S 7.2	Elementary Math teacher	A problem I can see with the students here is that they are constantly trying to keep up with both social and academic pressures. They are very social minded and also have parents who in many cases try to push them academically beyond their capabilities. I'm afraid many of our students get crushed when they discover themselves just one of a large crowd at high school. Many parents and students only think in terms of college as Cal. and Stanford and it must be quite a shock when they aren't accepted or if they are accepted when they discover the keen competition there.
S 8.1	Teacher	Communication from Superintendent to teacher. Although words may be spoken there is a real need for communication at all levels. Good interpersonal relations lead towards good communications. (Here) where change is positive and often rapid, it is imperative that lines be open for people to communicate their emotions and attitude whether positive or negative.
S 8.2	Teacher	I visited another school to examine some materials (on my own time). I had a conversation with the other teacher in which she remarked that she had learned more from talking to other teachers in the subject field than in any other way and expressed the wish that there could be much more conversation between teachers in the same level of school and subject matter.
S 8.3	Director of Special Education	Direction was given me to cut nurses aides from budget and reduce nursing time. Better communication (was needed about) health services in general over past few years so that they would have had higher priority in thinking of budget committee.

Category	Position of Respondent	Excerpt
S 8.4	Principal	The junior high coaches held a meeting with the principal and the assistant superintendent of schools. The purpose was to ask for extra pay for coaching junior high sports. The coaches stated that if they were not paid they would not coach dispite the fact that when they were hired they knew this was one of their responsibilities. When it was first requested the Central Administration was not decisive. (They) failed to make their position clear. The athletic director was weak.
S 8.5	Special Education	Brain damaged student appeared to be having very mild siezures, accompanied by change skin color and periods of raving-irrational type talk. Student is resident of State Mental Hospital. Took student home to hospital. Special Ed. coordinator called hospital and left orders that we be notified if student taking medicine for condition, and for student to stay home until dosage was adjusted. Student sent back to school next school day. No cooperation from hospital, though we have a number of their patients in the school. Not notified about potential suicide tryers, epileptics, etc. until they are pressed. (There is a) lack of communication between hospital and school. (We) need information if we are to handle some types of patients correctly, before something happens.
S 9.1	Business manager	Federal Programs such as NDEA require matching local funds. Funds were used for matching purposes that were needed for other programs.
S 9.2	Counselor	(The) School District must adopt an austerity budget. 3,000,000 dollars approximately must be pared from school costs in order for the budget to remain in the black. This move necessitates the loss of nurse services, psychologists, and other special services personnel, and the possible increase of class size. (There are) insufficient moneys to support the communities educational needs. (We need) a new approach or adjunct to school financing.
S 10.1	Elementary Curriculum Coordinator	The problem is the way textbooks are chosen and the way they are allocated. As in math, for example--one series was selected for grades K-3, another, very inferior series, for 4, 5, 6, and three different series for grades 7 and 8 and allocated on a 1/3 basis--assuming you would have exactly 1/3 of students in each group. The book chosen for the low track was harder to read than the other two. The middle grade books are not "new math" at all and it does not build on the good foundation built at primary level. (It was) the curriculum commission's selection in Sacramento. Local districts

Category	Position of Respondent	Excerpt
		should be given the privilege of selecting books from a recommended list to suit the needs of the district.
S 10.2	Math teacher	(A) teacher with doctor's degree (is) tending high school for a 50 minute studyhall of 80-100 students. (We are) not able to use non-certified personnel to do non-teaching jobs in school.
S 11	School secretary	A teacher's guide for an English course for terminal students had been developed and submitted for approval. The "teacher's guide" contained numerous errors in the use of capitalization and punctuation--as well as procedures to be followed in a few instances. The guide was then sent back to the office where it was prepared to be corrected. Curriculum guides for our district are prepared in another location than our own building.
S 12	Primary teacher	Before and after school, on teacher time, (there is a) crowding of (the) school calendar. Reduce (the) number of meetings held on teacher time, (to avoid) teacher frustration because of reduced time for classroom preparation.
P 1.1	Language teacher	In a group of 32, (where only 3 or 4 were out of their element) we were able to introduce new verb material late in the year aside from the textbook. I had spent until about December on purely oral Spanish for pronunciation and for fluency of speech; then when I switched to the text book we covered well only the present tenses. In order to prepare these bright youngsters better for whatever kind of second year work they might encounter, I used oral materials and blackboard notes to lead them to use (and know formation of) 7 other tenses. In the space of a month or so, I was happy to see that most of the students grasped the fundamentals and would be able to apply them.

Category	Position of Respondent	Excerpt
P 1.2	Principal of Senior High	One out-of-school youth and one in-school youth was selling drugs in school. Other students immediately informed the school officials of the incident and expressed willingness to work with enforcement agencies. Students were observed and arrested. Students who helped and were supported by others expressed a desire to prevent the school and young people from getting a negative reputation.
P 2.1	Foreign Language	The students had prepared a small talk which had to involve the participation of the whole class. The subject could range from current events to fashion. They were amazed at the length of time the conversation could carry and the amount of vocabulary at their reach. It made me realize again the usefulness of studying a language and not being able to read and write but also understand and converse (as a result of) the use of the audiolingual method of teaching a foreign language.
P 2.1	Chairman, Department of English	Over a period of one week, the students took over the teaching and taught ten to fifteen minute lessons on poems. Each student chose his own, prepared his own lesson plan from the experience the class had had with poetry and conducted the presentation in such a way that the poem's major values were determined.
P 2.2	Reading teacher 6-7th	My class and I were allowed to spend an entire week at Morro Bay studying the general ecology of the area. We stayed in a barracks at Camp San Luis Obispo with four other schools from Fresno, Sanger and Mendota.
P 3	Coordinator	A child had not been showing any academic growth or apparent desire to improve in his work or action. He was given full responsibility for the class play which he did with "great vigor". From this his work and attitude has shown quite a lot of improvement.
P 5.2	5th grade teacher	At our school the enrollment is quite heavy. Each fifth grade had an enrollment of 38 with facilities and supplies for 30. The administration was quick to transfer as many students as they could to relieve this situation. Also, we have excellent audio visual materials, and science materials available. All school supplies are

Category	Position of Respondent	Excerpt
		furnished to the students and being in a section that draws from some underpriveledged homes this is good. (This represents) good planning and a genuine effort of (the) administration to improve class loads that would effect teaching situations.
P 4.1	Elementary teacher	One pupil was making little progress academically and she felt somewhat rejected by the others. Also, her self-confidence was very low. We discovered that she has visual perception problems and that she views things and events much differently from the rest of us. She is now being corrected, thanks to the excellent testing service.
P 5.1	Social Studies teacher	We were allowed to organize a program of team-teaching consisting of various innovations. We developed a program of using discussion, audio-visual material, guided study, group study, and testing, (with) the support of local school administration.
P 6	Math teacher	Math teachers recommended purchase of several computors (electronic) to supplement the math teaching in the district. The board recognized the wisdom of such a request and let bids for the equipment.
P 7.1	Elementary teacher	Children as a part of science became involved in a learning experiment. They became tremendously interested in learning foreign words for objects. They became very excited over their ability to learn something as fast as they did these twenty foreign words. They then got the idea of doing their spelling the same way.
P 7.2	2nd grade teacher	A boy who had been raised twelve years of his life on an Indian reservation ran up to his teacher and happily exclaimed that he read the funny papers the night before. When this boy came to our school in September he was reading at about a 1.0 level. The largest contributing factor to this event is our remedial reading program.

Category	Position of Respondent	Excerpt
P 8.1	Teacher	One class presented a version of the Piper of Hamlin. A general invitation was not given because of conflicting schedules. Most of the older children knew a special event was in the making but had not received an invitation. A suppressed excitement was evident. They wanted very much to go. Waiting was difficult but their pleasure was genuine when they knew they could go. Their behavior was acceptable throughout and following the program.
P 9	Counselor	Met with Negroes to aerate feelings regarding school, ability to get along, any special problems Negroes face. Subjective evaluation: 1st time anyone had had this opportunity for reflection and interchange, benefited by understanding teachers better etc. Meetings with Caucasians and Orientals found all races eager to meet and understand each. Some expressed fears, anger, but surprisingly all were liberal and accepting of civil rights and need to have more communication.
P 10.1	Remedial teacher	The high school pupils seem to win a number of national honors and a good deal of favorable recognitions for a school of this size. There must be some good planning by the administration and some good teachers in the classrooms.
P 10.2	Head Counselor	Graduates of a year ago responded to a questionnaire about their high school experience and their suggestions for improvements. Most felt that their academic experience qualified them to do freshman-level work in college better than students from other schools.
P 11.1	Principal	In our Kindergarten program provisions have been made to retain a student for a second year when his maturation level is not sufficient to predict success for the first grade. This mother had been reluctant to have her child spend another year in the Kdgn. At 2 previous meetings I had suggested she visit the classroom of the more mature students and observe what we felt were skills needed for success. This she did and during our conference she expressed pleasure at having the opportunity to visit and changed her mind regarding her child's placement. The parent left my office with a feeling that we were sincerely concerned with the welfare of

Category	Position of Respondent	Excerpt
		her child. I think she will be supportive of schools and be more open to suggestions from school personnel in the future.
P 11.2	Superintendent	Principal gave short talk on why upcoming bond issue should be passed. Parents called Supt. to say how much better they understood need for passage of bond and what schools were trying to do.
P 12	Administration	Within the last 2 months the teacher turnover for the coming years was reported to be the lowest in district history.
P 12	Kindergarten teacher	We do not have to prepare the legal register, it is done at headquarters. I remember 14 years of sweating out percentage of absence, checking off verified absence in front of a secty, before putting it in register--eradicating an Easter week that was in the wrong square--and waiting on the last day to see if the master register checked, once it didn't and the culprit had left early and flown to Oregon and his register had to be rechecked by another teacher. The burdens of "book work" has been relieved somewhat by a centralized system.

APPENDIX C

Problem definition guidelines for Group A and guidelines and data form for Group B

GUIDELINES FOR PROBLEM ANALYSIS GROUP A

General

1. The worth of any problem analysis depends mostly on your own effort and ingenuity. The Problem Analysis Form (A) which you have has only two general headings because we want to know what points you consider most relevant without our suggesting a definite structure. Feel free to organize your ideas and information in any way that seems to fit the problem.

2. Please don't be too concerned about grammar or choice of words. What you write will be edited later. It is more important that you jot down all relevant information and ideas, however briefly. Be as specific as you can.

3. We have provided more writing space than you will usually need. But use the back if you need more space.

4. Since the problem at hand represents a real felt need for change in this school district, the results of your effort today will probably be used in planning actual policies or procedures. Therefore, anything you think is relevant should be included.

5. You should allow about half the available time for considering possible solutions (the last two pages).

GUIDELINES FOR PROBLEM ANALYSIS GROUP B

General

1. The worth of any problem analysis depends mostly on your own effort and ingenuity. The problem analysis form is intended to get your ideas explicitly spelled out and organized. It may or may not stimulate you to examine new aspects of the problem. We hope the form will supplement, but not interfere with, whatever problem skills you normally use.

2. Please don't be too concerned about grammar or choice of words. What you write will be edited later. It is more important that you jot down all relevant information and ideas, however briefly. Be as specific as you can.

3. We have provided more writing space than you will usually need. But use the back or margins if you need more space.

4. Since the problem at hand represents a real felt need for change in this school district, the results of your effort today will probably be used in planning actual policies or procedures. Therefore, anything you think is relevant should be included, even if it does not fit any of our questions.

5. You should allow about half the available time for considering possible solutions and next steps (pages 5 and 6).

(The following headings correspond to headings of the problem analysis form.)

Page 1

The Need The purpose of this initial statement is to get everyone started on the same problem. It is not meant to be a final or complete definition. Two or three minutes is all the time it deserves.

Desired Outcomes Specifically what effect are you trying to achieve? Please reserve solution ideas and programs for Page 6. List here only the important results that any such action would hope to produce. If there is just one main outcome desired, leave the remaining lines blank.

Page 2

Outcome 1 On the top line abbreviate to a few words the outcome which is most important in meeting this need. (It should be numbered "1" on the previous page.)

Please list all important reasons and values for wanting the outcome, however obvious they may seem.

Answer the questions about evidence as specifically as you can. How could a measurement or judgment be made? By whom?

Page 3

If on Page 1 you have listed only one main outcome desired, skip this page. Otherwise follow the same guidelines as for Page 2.

Page 4

Previous Actions Briefly describe each action taken in the past which was intended to improve the status of this problem. If the action was not successful, a few words about why it failed might be helpful. Include previous efforts to define the problem (e.g., group meetings, research, searches for information, etc.).

Limiting Factors Note here anything that might hinder a solution, but also please note (either here or under Solutions) ways in which obstacles might be overcome or avoided. Some limitations which are taken for granted may lose their force when assumptions are questioned or new approaches are considered.

Page 5

Possible Solutions It may help to review the information on previous pages both in getting new ideas about solutions and in evaluating them. Especially, try starting with one desired outcome and thinking of all the ways that this could happen, however absurd or impractical. Then see if these ideas can be made practical in any way. Please note in the left column as many different solution ideas as you can, however wild they seem, before you try to evaluate each one.

If a solution is likely to achieve one desired outcome but not others, note this under "Pros and Cons". Also note there any good or bad side effects, hidden costs, and so on.

In evaluating "Expected Effectiveness" you may group solution ideas together into "program" and rate the whole package. To make the rating scale finer you may combine two adjectives, such as "poor-fair" (P-F) or "excellent-good" (E-G).

Immediate Steps This part should be based on a careful review of the outcomes, values, limiting factors, and solution evaluations.

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PROBLEM ANALYSIS FORM B

	Name	Position
School		
Date		

The Need: What is the situation or condition in need of change, and what mainly causes it?

Desired Outcomes: What important effect do you hope to result from any change? Forget how the change might be accomplished for now. Just write down what outcome or result would satisfy you. (If you name more than one outcome, number them in order of importance.)

( )

( )

( )

Outcome 1: ______________________________

Why do you want this outcome? List the reasons and values.

____

____

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____

____

____

What would you accept as evidence that this outcome was achieved?

____

____

____

Would the evidence above convince others concerned that the outcome was achieved? If not, what additional evidence might convince them?

____

____

(Skip this page if there is substantially only one important outcome sought.)

Outcome 2: ______________________________

Why do you want this outcome? List the reasons and values.

____

____

____

What would you accept as evidence that this outcome was achieved?

____

____

Additional evidence needed to convince others? ______________________________

____

Outcome 3: ______________________________

Why do you want this outcome? List the reasons and values.

____

____

____

What would you accept as evidence that this outcome was achieved?

____

____

Additional evidence needed to convince others? ______________________________

____

Previous Actions: What actions have already been taken to meet the need, or to provide background information? With what results?

Limiting Factors: What will any proposed solution have to take into account? (circumstances, people, restrictions, etc.)

Possible Solutions: On the left below, list alternative ways that the desired results might be achieved. In the center column, rate the expected effectiveness of each solution: "excellent" (E), "good" (G), "fair" (F), "poor" (P). On the right, note briefly the main "pros" and/or "cons" of each solution.

Possible Solution	Expected Effectiveness	Pros and Cons

Immediate Steps: What are the two or three most reasonable alternative steps which might be taken next? Time demands, costs, information needs and the expected effectiveness of solutions are some of the things that need to be considered.

(a)____

____

____

(b)____

____

____

(c)____

____

____

APPENDIX D

Examples of completed problem definitions for treatment groups A, B and C. The examples shown are all definitions of the same problem in a given school district.

PROBLEM ANALYSIS--Group A

Brief Initial Statement of Need: A number of teachers, many of whom are tenured, have reached a plateau in their professional growth and development. Ways need to be found to upgrade the competency and motivation for growth in these teachers.

Background and Causes

1. Presently the system rewards are distributed on the basis of seniority, with the older teachers receiving most of the benefits. Many new teachers are asked to teach courses out of the area of their general competence, such as driver education and safety. This is thought to have particularly poor effects in the early stages of a teacher's career when his enthusiasm is at a high level.

2. Many teachers do not maintain and increase their knowledge in their subject area. Some of the causes for this might be:

    a. Lack of administrative machinery, such as salary incentives, supporting philosophy and policies, to aid the teachers in keeping up on recent developments in their field. Lack of communication regarding the availability of this machinery could also be a factor.

    b. Job descriptions are not sufficiently clear.

    c. Insufficient feedback as to success of administrative programs and policies.

3. Lack of ability on the part of the teacher to understand individual differences of students. Some of the factors contributing to this are:

    a. The generation gap. What aid could be made available to teachers to better understand students? The recent program on narcotics was quite helpful, but more is needed.

    b. Sheer numbers of students. It is difficult to treat 150 people per day as individuals.

4. Inconsistency between overall school and classroom philosophies. These two should clearly coincide.

5. Lack of administrative consistency and firmness toward faculty. The administration does not always speak with one voice; sometimes it does not speak at all.

6. Low morale among the faculty.

7. The inherent characteristics of the teaching profession sometimes serve to attract those people who want to avoid a competitive atmosphere and thus are more likely to reach a plateau in their professional growth.

8. The overwhelming and confusing nature of the bureaucracy.

9. The mental "instability" of teachers as a professional class.

Possible Solutions

1. The advantages in the system should be more equitably distributed between new and old teachers, particularly with respect to placement and teaching load.

2. Upward communication and participation structures could be improved. There are presently three formal structures through which teachers can communicate to the administration and take part in decision making. These are: the Principal's Advisory Council, the Ad Hoc Committee and through Department Chairmen. These have improved the situation considerably. However, the availability of these channels should be better advertised and, more importantly, there should be feedback as to the use made of them, the outcomes, etc. The administration should create the awareness that communication lines are open and messages are welcome. There should be faculty participation in Board meetings.

3. There is presently too much noise in the downward communication channels. Although information concerning policies and top-level bureaucratic functions is passed down, it is embedded in non-essentials and rumor. The result is that it requires too much effort on the part of the faculty to really know what's going on. Instruments of communication should be modified so that only essential information is communicated. For example, the Faculty Handbook could be considerably shortened and made an effective instrument for communication of policy.

4. The administration should offer more support and firm guidance to the faculty. Often the feeling on the part of teachers is that the administration is indifferent. This, in addition to the lack of knowledge about the functions of the top-level bureaucracy, creates a dysfunctional we/they atmosphere. Increased support could take the form of classroom visitation on the part of administration; frequent, perhaps scheduled, one-to-one meetings between administrators and teachers; increased formal social interaction both in and out of school.

5. Bureaucratic red tape should be trimmed to the essentials.

6. The teacher/student ratio could be lowered.

7. Various techniques could be used to help teachers better understand the students both as a group and individually. Inservice programs are one device intended to bridge the generation gap which has been used with some success. More programs of this kind are needed. Role playing techniques could be used to develop the teachers' perception of students and themselves. Also, more information could be made available to teachers on individual student backgrounds.

8. Various steps could be taken to both prevent and effectively deal with teacher stress. Flexibility of teaching schedule, such as is found in the quarter system, might be very helpful in this regard. Also, there should be an accepting and

supportive attitude toward teacher stress on the part of peers and particularly administration. This would ideally include an attempt on the part of the administration to relieve some of the pressures on teachers by manipulating the situation in some way - such as removing problem students and/or extra responsibilities, etc.

9. Selection and retention procedures also need to be re-evaluated. Some of the training techniques mentioned above could be instituted early in the teacher's career. If these proved to be unsuccessful in improving the teacher's performance, he could then be removed before tenure takes place.

PROBLEM ANALYSIS-- Group B

The Need: A number of teachers, many of whom are tenured, have reached a plateau in their professional growth and development. Ways need to be found to upgrade the competency and motivation for growth in these teachers. By competence is meant not only maintenance of knowledge in subject field, but also a teaching emphasis on thinking rather than memorizing, citizenship rather than grades.

The causes of teacher incompetence or lack of motivation to grow are:

1. Boredom. A number of teachers, particularly those who have been teaching for a long period of time, have lost sight of their original goals. They tend to regard teaching as simply a job to be done. They are uninterested in help or somewhat reluctant to ask for it.

2. Lack of success experiences with classes over a period of time. Teachers are frustrated with low achievers, discipline problems, and shortcomings in the curriculum.

3. Group dissension among the faculty or between faculty and administration.

The process of upgrading is difficult because:

1. Introduction of change in teaching methods is seen by the teacher as a personal threat.

2. Scapegoating on the part of the teacher - "they won't let me do such and such".

Desired Outcomes: What important effects do we hope to result from any effort to upgrade the effectiveness of tenured teachers.

Outcome 1: Students would be capable of critical thinking. This outcome is a desirable end in itself. Also, graduates would be able to evaluate issues rather than rely on whatever store of "facts" they had acquired in school and would have the courage to take the consequent stand on issues. The society would thereby benefit by being more capable of dealing with its problems, such as poverty, civil rights, etc.

Evidence of this outcome would be more sophisticated participation in civic affairs by graduates. Further, this participation would be dictated more by rational awareness than by self interest.

Outcome 2: All students would be prepared to be productive and happy citizens. This outcome is a desirable end in itself. Students (citizens) would have a more positive self image, and the total society would consequently benefit.

Evidence of this outcome (and of Outcome 4 below) would be as follows:

1. Improvement in citizenship as well as academic achievement.

2. Increased extra-curricular participation.

3. Percentage of dropouts would decline.

4. Attendance would improve.

5. Number of graduates who return to visit the school would increase.

6. Percentage of graduates that go on to hold positions of influence, such as public office, would increase.

Outcome 3: There would be more rewarding experiences for teachers. This outcome is desirable because the feeling of success on the part of the teacher would lead to more success. It would also be conducive to the teacher's mental health.

Evidence that this outcome was achieved would be:

1. Increased participation in voluntary assignments by teachers.

2. On referrals to the Dean, teachers would not tell Dean what form of punishment should be meted out.

3. Fewer complaints from teachers.

Outcome 4: The administration could concentrate more on innovation and long term planning rather than solving short term teacher problems. This would lead to the overall improvement of the entire educational system.

One indication that this outcome was achieved would be that parents would be more involved in the educational process and would be more willing to support the educational system through bond issues.

Previous Actions

There have been programs of orientation and inservice training as well as the current curriculum development project directed toward this problem. These have had some beneficial effects but do not really reach those that most need improvement. The Principal regularly evaluates teacher growth, but up until now this evaluation procedure did not include tenured teachers. The main limitation on the effectiveness of previous programs has been their voluntary nature. Those that want to improve, or at least maintain, their competency have taken advantage of them; those that have needed them the most have not.

Limiting Factors

1. Teacher unwillingness to accept direction - especially from the administration, toward whom there is a strong negative attitude.

2. Lack of desirability of meetings as a way of dealing with the problem. Teachers are usually too tired at the end of the day to attend meetings.

3. Curriculum development effort cannot be counted on for necessary leadership in dealing with this problem.

4. The dilemma created by teachers wanting more firm guidance, and at the same time resenting autocratic decisions.

5. System red tape and legal restrictions.

6. Small budget.

7. Lack of understanding of the real issues on the part of those in power.

Possible Solutions

1. Attempt to individualize the supportive atmosphere for the teacher and then follow through with concrete support for mutually agreed upon action. This would optimally be done on a year-to-year basis. That is, have an individual conference with each teacher, talking over and deciding what particular kind of inservice training would be desirable for this teacher. If the machinery for this kind of training doesn't exist, do what can be done, within reason, to implement it.

    Pro: This would give teachers a chance to communicate and give them the feeling that "someone cared".

    Con: The ineffectiveness of college courses (if this alternative is chosen) in upgrading teacher competence. This is largely due to the fact that college courses are not sufficiently suited to meet the needs of our teachers. Possibly our own inservice program could incorporate more appropriate courses that were specifically designed to meet the needs of our teachers.

2. Institute course and other requirements that would apply to tenured as well as newer teachers.

    Pro: It would shake the tenured teacher out of his complacent attitude. It would make him appreciate what it is to be a student again.

    Con: Teachers would be upset over having to do it, and this will perhaps cancel out any positive effects.

3. Encourage teacher involvement in industry so that he maintains knowledge of the state of the art, what is being required of employees, etc.

    Pro: Teachers will be better acquainted with what skills are currently in demand.

4. Some form of student evaluation of teachers, though preferably not through student-designed evaluations.

5. Case study of students to determine why one teacher has trouble with a particular student and another has no difficulty with him.

    Pro: Teachers often find things that they are doing "wrong".

    Con: This approach has been somewhat overworked recently.

6. More teacher/community interaction.

    Con: The courteous atmosphere which would prevail would preclude any real gain from such involvement.

7. Intradepartmental evaluations of teachers.

8. Better methods of teacher evaluation.

    Pro: Would enable the administration to discover some of the causes contributing to a teacher's general incompetence or complacency.

9. Passage of the bond issue.

10. More dynamic leadership from top-level administration.

11. Teacher transfers.

12. Create a position for someone to exclusively attend to teacher development.

Immediate Steps

1. Identification of those teachers who are in need of improvement - by small group discussion and classroom observation, including those of tenured teachers.

2. Determine what steps can be taken to improve those teachers.

3. Support the teacher in these corrective measures if such exist. If the teacher still does not improve, counsel him out of teaching or transfer them, either to another school or to a less critical spot.

PROBLEM ANALYSIS -- Group C

The Problem: How to upgrade the effectiveness of teachers, especially teachers who have tenure.

Desired Outcomes: What important effects do we hope to result from any effort to upgrade the effectiveness of tenured teachers?

Outcome 1: More students can perform the skills and meet those objectives which each course is designed to achieve. This outcome should lead to more successful entrance by graduates into careers or colleges of their choice. Thus, evidence of achievement of this outcome could be higher grades by graduates of high school while they were in college, more reported satisfaction with their careers by graduates and perhaps even better performance ratings of graduates by their work supervisors.

To the extent that grades in high school are determined by achievement of specific objectives, such grades would provide more immediate evidence of this outcome. Outcomes 3 and 4 in themselves provide indirect evidence of achievement of this outcome.

Outcome 2: For every course of instruction, clear objectives stating what students should be able to do as a result of instruction are spelled out in detail. Measures of achievement of these objectives are the basis for grading students and, more importantly, provide the standard against which teachers' effectiveness can be judged. It is important to note that this does not imply that students are expected to reach the same final level of achievement in a course no matter what their initial state of knowledge is on entering the course. Effectiveness of teachers would be judged in terms of progress made by students from their initial state of skill on entering the course, however low or high this level of achievement may be. This would require some form of pretesting as a regular procedure for every course or unit.

This outcome would enable all concerned to understand clearly the criteria against which teaching is evaluated so that evaluation and promotion might be accomplished fairly. It would also provide a better basis for revising the curriculum.

As evidence that this outcome was achieved, one could look at final course exams and see whether the questions are geared specifically to course or unit objectives.

Outcome 3: Students are more enthusiastic about school. This outcome is a desirable end in itself and also leads to more learning and greater interest in issues of social importance on the part of students.

Objective evidence of this outcome might be the number of voluntary questions and comments made by students. Also when asked what he was doing, a student might give a more intense, involved and elaborate response. Most teachers feel that enthusiasm can be judged fairly reliably simply by observation of students in class.

Outcome 4: Parents are more satisfied with the school system. This is evidenced by more positive and less negative feedback from parents to the school.

Outcome 5: Teachers are more involved, aroused and enthused themselves in the educational process and in their own subject area.

Previous Actions

1. Inservice workshops have been conducted to upgrade teacher effectiveness. Prevailing opinion seems to be that they were not too effective. Curriculum development workshops in the summer have apparently been good for the teachers doing the writing, but other teachers frequently ignore the results of these efforts.

2. There are salary scale incentives for advanced education by the members of the faculty. However, college credits do not seem to correlate highly with real progress in improving teaching effectiveness, so that this solution is of limited success.

Limiting Factors: What will any proposed solution have to take into account?

1. Many of the teachers who have been in the system for a long time may not be receptive to the "prior objectives" approach to planning instruction, as spelled out under Outcome 2.

2. Teachers who seek tenure itself as a goal, perhaps for the sake of security, often are less concerned about the effectiveness of their teaching and less involved in their subject area.

3. As a result of the previous history of conflict between teachers and administrators over the issue of merit pay, any plan of action would have to include a special effort to overcome strong opinions associated with the idea of merit pay. For example, teachers may fear that administrators will not give teachers the power to change the very things which are used as criteria in judging the teachers' effectiveness.

4. There may be discrepancies between teachers and administrators as to what are the main objectives.

5. There is some resentment over the gap in pay between teachers and administrators.

Possible Solutions

1. Base the promotion of a teacher and other professional rewards on the achievement of his students and the teacher's competence in his own subject area. (Solution ideas 2 through 5 below elaborate possible means for implementing this idea.)

2. If teachers are to be judged and promoted on the basis of what their students achieve, there must first be a clear agreement as to what the particular students in a teacher's charge should be expected to achieve. This means that objectives for the class and for a particular student in the class must have been spelled out clearly ahead of time. Further, the degree of attainment of these objectives, or percent of students expected to achieve at a given level, should be established as a basis for rating the success or effectiveness of the teacher. If objectives are not spelled out and agreed upon, the evaluator may have different standards of effectiveness from the teacher and the resulting evaluation will not be fair. Even if the teacher and supervisor believed in the same general objectives, failure to spell out these objectives in detail might result in evaluation based upon different judgments as to specifically what achievement of these general objectives means. Therefore, a first requirement for promotion on the basis of effectiveness is for objectives of instruction to be spelled out in detail. This could be accomplished through the faculty of the district itself being given time to spell out these objectives and/or through borrowing, editing and selecting objectives developed by other projects, school districts or states. This approach does not require that objectives for a given course and age level be uniform throughout the district or even within a school. If a particular teacher has certain unique objectives that he and no other teacher wishes to accomplish, then his effectiveness should be judged on the basis of those objectives to the extent that they are represented in his course. If on rare occasions the teacher and the supervisor cannot agree as to the appropriateness of objectives for a course, some sort of consensus or compromise should be worked out in advance so that evaluation may be made on a fair basis. Since unique objectives of a particular teacher tend to be rare, a practical procedure would be to spell out a specific set of objectives which suit most of the faculty members. Any given teacher should then agree that those are appropriate objectives or pick out exceptions and in place of those exceptions spell out the unique objectives that he would like to achieve instead.

   Once the objectives are spelled out, the next major prerequisite to fair evaluation is that adequate measures of achievement of these objectives be agreed upon. Again, the teacher's own efforts to create measures could be combined with measures developed by other districts or projects. Once the measures are agreed upon there remains the problem of norms as to what degree of attainment or progress in a year's time should be expected of students at different levels in trying to reach these objectives. If normative data of this sort are not available, it may be best to delay merit ratings based on such measures for two or three years until enough data are collected to provide a baseline expectation for what students with different entering proficiencies should be able to achieve.

   Once promotion is clearly based on measured achievement of specified objectives, teachers will naturally have the incentive to design their instruction to achieve these objectives in the best way possible. Some evidence that this does take place may be seen in the experience with use of the advanced placement test in the district. Apparently the orientation toward accomplishing specific skills measured by these tests helped focus the analysis and revision of high school English courses in the district.

If progress toward objectives is to be used as a basis for rating teacher effectiveness, there must be measures of the initial state of knowledge of students upon entering the course or upon entering a given unit of instruction. This requires the use of some form of pretesting before a unit or a course in order to establish the level of each student.

3. In order to increase the effectiveness of all teachers and to reduce the variation in level of accomplishment of students entering the course, coordination on specific course objectives should take place between the high school and the elementary districts feeding it. If this does not take place through unification, then small standing committees in each subject matter might be given released time to insure this coordination of specific objectives. This would also give each student a feeling of greater continuity. In order to give this task of coordination of objectives some overall comprehensiveness and order, it would be necessary to create or adopt a general structure within which all subject matters could be related across all age levels.

4. Administrators, especially principals, might be rewarded and promoted on the extent to which they create a climate conducive to learning. Such an objective might be judged on the basis of actual progress of students toward specific objectives and also on the satisfaction of teachers, students and parents that such a climate is present. The main avenue through which administrators may accomplish this is through district and school policy which sets higher priorities on effective teaching than on some of the traditional concerns such as attendance, tardiness and other logistical matters. Basing promotions on accomplishments of specific objectives by students rather than upon these secondary criteria would naturally tend to promote a climate for learning.

5. Regarding the outcome of getting more teachers more involved in their own subject fields, to some extent this may result from rewarding effective teaching, in that how much students learn depends partly on the teacher's own competence in the subject area. However, additional rewards for advancement in their subject fields could be provided. The present policy of pay increments for college credits is only limited in effectiveness in that credit in college courses is widely perceived as not being correlated very highly with advancement of competence. Therefore, perhaps the rewards should be for the intended effects of these courses rather than for the mere taking of a course or workshop in itself. For example, teachers might be given tangible rewards for suggesting new objectives which are agreed to be worthwhile by most other members of the faculty in that subject area, or for new teaching methods which when tried are thought worthy, or for having convinced other faculty members of their competence in special subfields to the extent that they are recognized as a good potential resource person for particular subject fields.

   Perhaps the safest basis for judging advancement of a teacher's competence in a subject area is the performance of his students. If in addition one wishes to try to measure more directly this type of competence, it may be wise to bring in outside experts or objective measures of some kind. For example, master teachers from other districts might judge the promise or effectiveness of innovative methods, materials or objectives, although difficulties may arise in negotiating contractual relations with teachers outside the district. Another possible approach is to ask nationally recognized experts what are some of the recent developments and ideas in that subject area which a good teacher should be aware of. This could then provide the basis for a "current events" test of teachers' awareness of current developments.

6. There might be more flexibility in the progression hierarchies and rules for promotion set up by the district. The time limits on steps through which a teacher progresses may put too low a ceiling on rate of advancement for teachers who are especially competent. The provision for especially competent teachers to skip steps might provide additional incentive, as might the provision for transferring more than seven steps to a new district. There might also be separate progression hierarchies for teachers, administrators and perhaps even counselors. The fact that the highest paid teacher is paid less than the lowest paid administrator seems to put an arbitrary ceiling on the incentive for especially competent teachers. This policy may also force the use of highly paid administrative personnel for functions which lower paid employees could well perform. Separate progression hierarchies would have the added advantage that teachers who are especially competent would not have to leave their occupation in order to progress in salary. Rather our best teachers would be kept teaching and rewarded for improving their skills rather than changing to a different occupation for which they may have little talent, i.e., administration.

Possible Immediate Steps

1. The district staff might meet to jointly consider this problem and map out some of the alternatives.

2. The Board limitation on transferring steps, that is, the limitation to seven, could be reconsidered.

3. A new plan for salary incentives based upon demonstrated competence as well as formal degrees, including a master's degree perhaps, could be outlined.

4. Administrative changes which would permit teachers to have a greater voice in setting objectives and school conditions necessary to meet these might be explored and discussed.